

Journal of Mycology

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NEW SPECIES OF FUNGI.

BY CHARLES H. PECK.

Clitocybe pulcherrima Peck n. sp.

Pileus fleshy, convex becoming umbilicate or centrally depressed, decurved on the margin, glabrous, lemon yellow, flesh white, yellowish under the cuticle; lamellae thin, close, arcuate, decurrent, whitish or faintly tinged with yellow; stem equal or slightly tapering upward, solid above, hollow toward the base, subglabrous, colored like or a little paler than the pileus; spores nearly or quite globose, $4\ \mu$ in diameter.

Pileus 2.5-5 cm. broad; stem 2.5-4 cm. long, 6-8 mm. thick. Among fallen leaves. Near Detroit, Michigan. October. Dr. O. E. Fischer.

A very beautiful species, belonging to Group 3, Tribe Disciformes, and related to *Clitocybe vernicosa*, *C. veneris* and *C. venustissima*, but differing from all of these in its pale yellow pileus.

Pleurotus elongatipes Peck n. sp.

Pileus fleshy but thin, convex or nearly plane, even on the margin, glabrous, white, flesh white; lamellae thin, close, rounded behind, adnexed, white; stem very long, solid or stuffed, often more or less curved or flexuous, usually eccentric, glabrous above, more or less tomentose toward the base, white; spores globose, $4\ \mu$ in diameter.

Pileus 5-10 cm. broad; stem 5-15 cm. long, 6-10 mm. thick. Decaying wood in woods. Near Detroit, Michigan. October. Dr. O. E. Fischer.

This species belongs to Group 2, Tribe Excentrici and is related to *P. lignatilis*, from which it may be separated by its glabrous pileus, adnexed lamellae, more glabrous elongated stem and by the absence of a farinaceous odor.

***Lactarius hibbardae* Peck n. sp.**

Pileus fleshy, broadly convex or nearly plane, with or without an umbo, slightly zonate, dry, minutely tomentose or pubescent, grayish brown tinged with pink, darker and smoother in the center, even on the thin and sometimes wavy margin, flesh whitish, odor weak or none, milk white, taste acrid; lamellae thin, narrow, close, adnate, some of them forked, cream color; stem equal or slightly tapering upward, stuffed, glabrous below, clothed at the top with a minute whitish tomentum, pinkish white; spores globose, 6-8 μ broad.

Pileus 1.5-2.7 cm. broad; stem 2.5-4 cm. long, 3-6 mm. thick. Ground under young pine trees. West Roxbury, Massachusetts. October. Miss A. Hibbard.

The species is related to *L. glycosmus* from which it may be separated by the lack of squamules from the pileus, the absence of the very distinct and peculiar odor of that species and by the different character of the surface of the stem. The plants are sometimes caespitose. The species is dedicated to its discoverer.

***Entoloma suave* Peck n. sp.**

Pileus thin, broadly convex, umbilicate, with decurved margin, glabrous, shining, grayish brown; lamellae moderately close, slightly rounded behind, adnexed, yellowish becoming flesh color; stem equal or nearly so, glabrous, stuffed, whitish or pale yellow; spores broadly elliptic or subglobose, even, 6-8 μ long, 5-6 μ broad.

Pileus about 2.5 cm. broad; stem about 2.5 cm. long, 2-3 mm. thick. On old stumps in swampy places. Ellis, Magnolia and Newton, Massachusetts. November. G. E. Morris.

This is a very neat and attractive little mushroom, having a very regular glabrous and shining pileus and a beautiful nearly straight stem. Its peculiar features, which easily separate it from nearly all other species of the genus, are its umbilicate pileus and the even, not angular, spores.

***Leptonia abnormis* Peck n. sp.**

Pileus thin convex, broadly umbilicate, glabrous, hygrophanous, blackish brown, shining and obscurely striatulate on the margin when moist, dark grayish brown when the moisture has escaped, flesh colored like the pileus; lamellae broad, subdistant,

slightly rounded behind, adnexed, pinkish or pale flesh color when mature; stem equal, glabrous, hollow, whitish; spores broadly elliptic or subglobose, 6-7 μ long, 5-6 μ broad.

Pileus 2-2.5 cm. broad; stem about 2.5 cm. long, 2 mm. thick. Ellis, Massachusetts. November. G. E. Morris.

This species is peculiar in its glabrous pileus and broad shallow umbilicus. This is likened by Mr. Morris to the concavity of a kid-glove fastener.

***Pistillaria batesii* Peck n. sp.**

Densely gregarious, forming elongated almost compact patches on the stem of the host plant; club soft, fleshy, ovate or oblong, obtuse, sessile or narrowed below into a very short stem, pallid when moist, grayish pink and pruinose when dry, .5-1 mm. long; spores filiform, straight or curved, hyaline, 10-20 μ long, 1-2 μ broad.

Stems of purple poppy mallow, *Callirhoe involucrata*. Red Cloud, Nebraska. July. Rev. J. M. Bates.

This is one of the smallest species of the genus, and is parasitic on the under side of the creeping stems, appearing first near the base and advancing toward the growing point. I wish it to commemorate the name of its discoverer. Albany, New York. December 2, 1907.

DR. REHM'S FIRST REPORT ON GUATEMALAN ASCOMYCETAE.*

W. A. KELLERMAN.

Collections of Fungi in Guatemala the past three years include a large number of Ascomycetae. A dozen of these were placed in Dr. H. Rehm's hands recently and I am permitted to publish below his determinations, comments and descriptions of new species.

The specimens represent widely distant and diverse regions of that Republic, as well as great extremes in altitude; the Departamento, as well as exact locality in each case is indicated.

All of the remaining ascomycetous material secured will be submitted to Dr. Rehm, and the results will be published in later Numbers of this Journal.

* Contributions to Guatemalan Mycology, V.

POLYSTIGMA PUSILLUM Sydow (Ann. Myc. 1904, p. 167).

Cfr. Sacc. Syll. XVII, p. 780.

Sierra de las Minas (near San Gerónimo), 225 m. alt., Dept. Baja Verapaz, Guatemala, 1 Mar. 1907, leg. W. A. Kellerman No. 6155, *Andira excelsa*.

Exemplaria Sydowiana a Donnell Smith in *Andira excelsa*, Dept. Escuintla, Guatemala, lecta.

PHYLLACHORA ASPIDEOIDES Sacc. et Berl.

Cfr. Sacc. Syll. IX, p. 1013.

Exs. Rehm Ascom. 1382.

Sanarate, 810 m. alt., Dept. Guatemala, 29 Dec. 1906, leg. W. A. Kellerman, no. 6008.

ASTERINA MELASTOMATIS Lév.

Cfr. Ast. Melastomatis Lév. in Sacc. Syll. I, p. 51; Earle, Torr. Bot. Club, 1899, No. 12.

Melastomaceae (*Clidemia*?) Dept. Izabal, Livingston, 10 m. alt., 18 Jan. 1905, and Morales, 57 m. alt., Guatemala, Mar. 1907, leg. W. A. Kellerman, Nos. 6142, 6223.

PHYSALOSPORA PHASEOLI P. Henn.

Cfr. Sacc. Syll. XVII, p. 580.

VAR. GUATEMALENSE Rehm n. var.

Maculae orbiculares luteolae, 1-3 cm. lat., demum confluentes. Perithecia dispersa, globulosa, nigra, demum hemisphaerice prominentia, 0.15-0.2 mm. Asci 70-80 x 12 μ . Sporae oblongo-orbiculares, 9 x 8 μ , 1-stichae. Paraphyses filiformes, 1.5 μ .

In foliis———?, San Rafael near Guatemala City, Guatemala, 12 Feb. 1905, leg. W. A. Kellerman, no. 6224.

Modo peritheciorum minutae atque sporarum forma aliquantulum differt a descriptione citata. Physalosporae in foliis Phaseoli Rio Jurná St. Clara Amazoniae lectae.

PHYLLACHORA JACQUINIAE Rehm n. sp.

Stromata totum folium occupantia, gregaria, utraque in pagina conspicua, in epiphylo magis prominentia, in hypophyllo tenuissime valve cincta, hemiglobosa vel oblonga, atra, 0.3-0.6 mm. diam., perithecia globulosa 1-3 minima, haud perspicue ostiolata includentia. Asci cylindracei, apice rotundati, 100 x 14-18 μ , 8-spori. Sporae ellipsoideae, utrinque rotundatae, glabrae, hyalinae, 1-cellulares, strato mucoso tenuissimo obductae, 14-

15 x 8-9 μ , 1- rarius 2-stichae. Paraphyses filiformes, septatae, 2-3 μ cr.

Ad folia Jacquiniae aurantiacae Ait. El Rancho, Dept. Jalapa, Guatemala, leg. W. A. Kellerman, no. 4333.

Stromatibus perparvulis, totum folium quasi atramento conspurcatum, relinquentibus, creberrimis, dein magnitudine sporarum praeclara species.

PHYSALOSPORA KELLERMANII Rehm n. sp.

Perithecia in utraque foliorum languescientium, inde fusciculorum pagina gregarie innata, hemisphaerice prominentia, lenticularia, glabra, atra, minutissime papillata, demum foveolam nigram in folii parenchymate relinquentia, parenchymatice, fuscicule contexta, 0.2 mm. diam. Asci cylindranei, teneri, 60 x 8 μ , 8-sporei. Sporae oblongae, utrinque rotundatae, 1-cellulares, hyalinae, guttulis minimis repletae, 12 x 6 μ , 1-stichae. Paraphyses filiformes. Ad *Stillingiae acutifoliae* (Müll. Arg.) Benth (?) folia.

Livingston, Dept. Izabal, Guatemala, 18 Jan. 1905, leg. W. A. Kellerman, no. 4339.

Propter perithecia demum fere sessilia paraphysibus modo ab *Guignardia* distat.

XYLARIA (?) CONOCEPHALA B. et Br.

Cfr. Sacc. Syll. I, p. 314; Cooke in *Grevillea* XI.

Los Amates, Dept. Izabal, Guatemala, alt. 90 m., 20 Feb. 1907, leg. W. A. Kellerman, no. 6226a.

Descriptio speciei l. c. atque mensura sporarum 18-20 x 5-8 μ apud Cooke, in nostris exemplaribus 20-22 x 6 μ bene quadrant, non minus exemplar a cl. Ule in Brasilia lectum cum descriptione exemplaris in Cuba lecti. Stromata nostra 8-9 cm. long., 1.5-2.5 cm. lat., stipite 1-4 cm. long, 0.5-1 cm. lat. longitrorsum furcato, glabro.

XYLARIA (Xyloglossa) ALBOPUNCTULATA Rehm nov. sp.

Stromata erecta, oblongo-claviformia, utrinque plus minusve compressa, apice rotundata, in stipitem c. 0.5 cm. long. et 0.8 cm. lat. abeuntia, glabra, carbonacea, 5-6 cm. long, 1.5 cm. lat., extus fusca, longitudinaliter substriolata, versus stipitem nigrescentia, intus solida, nigra, perithecis plane immersis, globosis, 1 mm. diam., ostiolis minimis, nigris, extus strias in areolis orbicularibus albidis, 0.3-1 mm. lat. perspicuis punctulata. Asci cylindranei, longissimi, 7 μ lat., 8-sporei. Sporae fusiformes, plerumque naviculares, fuscae, 1-cellulares, 15 x 6 μ , 1-stichae. Paraphyses filiformes.

Los Amates, Dept. Izabal, Guatemala, alt. 90 m., 20 Feb. 1907, leg. W. A. Kellerman, no. 6226b.

Species proxima *Xylaria grammica* Mont., differt striis stromatis distinctis confluentibusque, peritheciis minoribus atque defectu arcularum albidarum.

XYLARIA MYOSURUS Mtg.

Exs. Rick f. austr. am. 27.

Los Amates, alt. 90 m. Dept. Izabal, and Retalhuleu, alt. 237 m., Dept. Retalhuleu, Guatemala, 10 Jan. 1907, leg. W. A. Kellerman, nos. 6227, 6228.

TRICHOSCYPHA TRICHOLOMA Mont. Ann. sc. nat. 1834, p. 77, tab. 4, f. 2; Cooke Mycogr. p. 252.

Cfr. Sacc. Syll. VIII, p. 160.

Synon: *Trichopeziza Hindsii* (Berk.) Cooke, Mycogr. p. 252.

Pilocratera Hindsii P. Henn. (Engl. bot. Jahrb. XIV 4, p. 363).

Peziza sulcipes Berk. (Hook. Journ. 1842, p. 141).

Trichopeziza sulcipes (Berk.) Cooke l. c. p. 252.

Los Amates, Dept. Izabal, 90 m. alt. Guatemala, 20 Feb. 1907, leg. W. A. Kellerman no. 6229.

Secundum Massee (Lin. soc. 31, p. 507) *Tr. Hindsii* Berk. syn. *Tr. sulcipes* Berk. et Cooke Mycogr. f. 199, et *Tr. sulcipes* syn. cum *Tr. tricholoma* (Mont.), Cooke Mycogr. f. 202. E contrario icones Cookei non quadrant cum Patouillard (Ann. myc. IV, p. 98), qui dicit: "Lachnea Hindsii et *L. tricholoma* Pat. proxime cognatae, utraque "d'une belle couleur saumon" modo sporis differunt, apud *Hindsii* ovoideis, utrinque obtusis, 2 magni guttatis, 25-30 x 12-15 μ , opud *tricholoma* ovoideis, utrinque acutatis, haud guttatis, 28-35 x 12-15 μ ." Exemplaria Kellermani autem sporis ellipsoideis, utrinque acutatis, crasse tunicatis, guttas oleosas 2 magnas atque 2 parvulas apicales includentibus gaudent. Asci (?). Excipulum e cellulis subrotundis hyalinis, 10-15 μ lat. contextum extus squamulis parvulis, crebris, versus marginem ciliiformiter, 1 mm. long., 100 μ ad basim latis, ex hyphis plus minusve conglutinatis, rectis, obtusis, septatis, hyalinis, crasse tunicatis, 5-10 μ cr. compositis obtectum. Apothecia cyathiformia, 2 cm. longe stipitata, sicca sublutea, sed color *Hindsii*, "amoene ruber" non convenit.

NEOTIELLA SERICEO-VILLOSA Rehm sp. ad interim.

Apothecia gregaria, ligno putrido insidentia, primitus globoso-clausa, demum urceolata, expansa, campanulaeformia, regular-

iter marginata, haud stipitata, disco coeruleo-livido, extus sericeo-villosa usque ad marginem, fuscidule cinerea, pilis simplicibus, rectis vel subcurvatis, interdum conglutinatis, obtusis, glabris, septatis, 500μ long., usque ad apicem aequaliter $5-7\mu$ lat., subhyalinis, fragilibus obiecta, 0.5-5 cm. diam., 0.5-2 cm. alt. Hymenium plane involutum!

Volcano Atitlán, alt. 2700 m. Dept. Solalá, Guatemala, 16 Feb. 1906, leg. W. A. Kellerman, no. 6204.

Peziza pulcherrima, hymenio plane carens, secundum formam et excipulum hirsutum forsitan Neotiellae Cooke species. Cfr. Sacc. Syll. VIII, p. 190. Similis videtur Lachnea Plumiera Tr. (Sacc. Syll. VIII, p. 170) Americae cent.

—————? On Cactus (Opuntia), Laguna (Lake Amatitlán), Dept. Amatitlán, alt. 1200 m., 8 Feb. 1905, leg. W. A. Kellerman, no. 6225.

"Asci $40-46 \times 25-32\mu$, sporae $20-22 \times 8\mu$ hyalinae."

Aegre fero, me plurimis microscopicis praeparatis intra excipula crasse tunicata modo ascos dispersos ovaes sporas plane involutas includentes invenisse. Constructio Ascomycetis suspicari licet ad Myriangiaceas pertinentem, haud Pyrenomycetem.

CULTURES OF UREDINEAE IN 1907.¹

BY J. C. ARTHUR.

The present article forms the eighth of a series of reports² by the author upon the culture of plant rusts, covering the years 1899 to the close of 1907. The grass and sedge rusts form a prominent part of the year's work, the same as in previous seasons, but it has been possible to include also some very interesting studies of a number of species of Gymnosporangium. This was chiefly brought about by two excursions made by my colleague, Mr. F. D. Kern, and myself for the express purpose of securing this sort of culture material, and for making observations regarding probable alternate hosts. The first trip was to Lake Forest, Ill., on April 6, where we secured *G. clavipes*, *G. clavariiforme* and *G. nidus-avis* in the locality where the last two were obtained by Dr. R. A. Harper for the distribution in Ellis & Everhart's North American Fungi and Fungi Columbiani. Explicit directions were given us by Dr. Harper to enable us to

¹ Read before the Botanical Society of America at the Chicago meeting, December, 1907.

² See Bot. Gaz. 29:268-276, 35:10-23; Jour. Myc. 8:51-56, 10:8-21, 11:50-67, 12:11-27 and 13:189-205.

go to the right spots. The second trip was to Colorado where collections were made April 27 at Boulder, May 1 at Glenwood Springs and May 2 at Wolcott. Unusual success attended this search for material, due in large part to the solicitous assistance of Mr. E. Bethel, of Denver, President of the Colorado Academy of Science, who accompanied us to Boulder, and gave detailed directions for finding infested trees at the other places. Mr. Bethel's intimate knowledge of the localities, and his own extensive observations upon these and other rusts of Colorado, all being placed at our disposal, made the few days of our stay in the state remarkably rich in results. The species of *Gymnosporangium* and *Roestelia* obtained upon this trip were found upon subsequent study to be in part quite distinct from the well known species to which they have heretofore been referred, and in part entirely new discoveries. These forms have recently been named and characterized by Mr. Kern,³ and two of the species, *G. Betheli* and *G. inconspicuum*, have been successfully cultivated.

For the third time the Botanical Society of America generously made a grant to forward this series of studies. This year it was sufficient to pay in large part for the assistance needed in testing the viability of spores, making the sowings, and recording the results, the balance being supplied by the Indiana Experiment Station.

The work was done by Mr. Frank Vasku, a senior student of the University of Iowa, recommended by Professor T. H. MacBride. Like the two previous men from the Botanical Department of the University of Iowa, who have assisted in this work, Mr. Fred. J. Seaver in 1903 and Mr. F. D. Kern in 1904, Mr. Vasku showed exceptional skill in conducting this class of work. His quick understanding of the problems, careful and accurate manipulation, and untiring devotion, were large factors in determining the amount and value of the season's results. Most of the sowings of *Gymnosporangium* spores were made by Mr. Kern, who took an especial interest in this part of the work, as it bore upon the subject of a thesis in preparation for the master's degree.

In order to study as many species as possible from a wide range of localities, and in this way to investigate the North American rust flora as a whole, it is necessary to depend upon the good will and generosity of contributors for much of the culture material and for hints regarding probable alternation of hosts. Those who have aided the work this year are Rev. J. M. Bates, Red Cloud, Neb., leading with 30 collections of culture material, and Messrs. E. Bethel, Denver, Colo., W. A. Kellerman, Columbus, Ohio, J. Dearness, London, Ont., C. W. Edgerton, Ithaca, N. Y., A. O. Garrett, Salt Lake City, Utah, H.

³ Bulletin Torrey Club 34:459-463. 1907.

D. House, Clemson College, S. C., J. J. Davis, Racine, Wis., T. D. A. Cockerell, Boulder, Colo., D. Reddick, Ithaca, N. Y., R. J. Pool, Lincoln, Neb., E. W. Olive, Madison, Wis., F. L. Stevens, West Raleigh, N. C., C. F. Baker, Santiago de la Vegas, Cuba, and Geo. W. Carver, Tuskegee, Ala. Host plants suitable to grow in pots and be used for inoculation were contributed by C. S. Sargent, Jamaica Plains, Mass., E. Bethel, Denver, Colo., and J. J. Davis, Racine, Wis. For these favors, and for the hearty co-operation of the above and other correspondents most grateful acknowledgment is here extended.

During the present season 98 collections of material with resting spores and 20 collections with active spores were employed, from which 438 drop cultures were made to test the germinating condition of the spores. Out of the 98 collections with resting spores 29 could not be brought to germination, although seemingly in perfectly healthy condition. This left 68 collections of available material, with which the cultures were made. These 68 collections belonged to 47 species of rusts, a considerable part, however, being forms whose life cycle had already been ascertained, the sowings being made for purposes of verification or extending the range of hosts. Beside these collections of resting spores sowings were made of nine species of *Gymnosporangium*, and of a few species of *Coleosporium*, *Aecidium* and *Peridermium*. Altogether 296 sowings were made, employing for the purpose 113 species of hosts, and more than two and a half times that number of individual plants, all grown temporarily in pots, so that the work could be done in the greenhouse under perfect control. In a few cases where small potted plants were not available cuttings were used, being kept alive by frequently changing the water in which they were thrust, and successively cutting off a bit of the stem to give fresh absorbing surface. The results of this work are given in the following paragraphs, and are divided into negative results, positive results with species whose life cycles have already been ascertained by the writer or other investigators, and positive results with species whose life cycles are now first placed on record.

Of the trials giving negative results the following may be recorded to serve for reference in future studies:

I. PUCCINIA on *Carex Pennsylvanica* Lam., collected at Sargent, Neb., by Rev. J. M. Bates, was sown on *Aesculus glabra*, *Napaea dioica*, and *Symphoricarpos racemosus*. Another collection made near Lafayette, Ind., by Mr. Frank Vasku, was sown on *Anemonella thalictroides*, *Ranunculus septentrionalis*, *Solidago Canadensis*, *Viola striata*, and *Trillium recurvatum*.

Still a third collection made at Boulder, Colo., by the writer, was sown on *Hydrophyllum capitatum*, *Lactuca Canadensis*, *Iris versicolor*, *Phryma leptostachya*, *Artemisia serrata*, and *A. dracunculoides*. None of these sowings gave infection. Similar material had been tried on five of these hosts before, and on twenty-nine other species, all with negative results.⁴ The rust on this host is common in the northern states east of the Rocky mountains, and appears from its morphological characters to be distinct from any described form. Fifty-five sowings have now been made, beginning in 1903, using forty-three species of hosts, and as no inoculation has been effected, the necessity for careful field observations to detect the probable alternate host becomes highly imperative in order to determine the real life cycle.

2. PUCCINIA on *Carex graviora* Bailey, sent twice by Rev. J. M. Bates, first from St. Paul, Neb., was sown on *Aesculus glabra*, *Viola cucullata*, *Ribes Cynosbati*, and *Hydrophyllum Virginicum*, and second from Red Cloud, Neb., was sown on *Hypoxis erecta*, *Houstonia purpurea*, *Laciniaria spicata*, *Lactuca Canadensis*, and *Artemisia dracunculoides*, with no infection. Similar material from the same region has been sown in previous years upon thirty-four other species of hosts with negative results.⁵

3. PUCCINIA on *Carex Douglasii* Boott. collected at Valentine, Neb., by Rev. J. M. Bates, was sown on *Symphoricarpus racemosus*, *Napaea dioica*, *Psoralea Onobrychis*, *Aesculus glabra*, *Laciniaria spicata*, *Hypoxis erecta*, and *Flacata comosa*, with no infection.

4. PUCCINIA ELLISIANA Thuem., on *Andropogon scoparius* Michx., collected at Boulder, Colo., by Mr. E. Bethel, was sown on *Arabis* sp., *Thalictrum dioicum*, *Actaea alba*, *Psoralea Onobrychis*, *Polygala Senega*, *Viola striata*, *Polemonium reptans*, *Solidago Canadensis*, *Boltonia asteroides*, *Senecio obovatus*, *Lepachys pinnata*, and *Smilacina stellata*, with no infection.

5. PUCCINIA VIRGATA Ellis & Ev., on *Chrysopogon avenaceus* (Michx.) Benth., collected at Grand Island, Neb., by Rev. J. M. Bates, was sown on *Ceanothus Americana*, *Napaea dioica*, *Caulophyllum thalictroides*, and *Cassia Chamaecrista*, with no infection.

⁴ See Jour. Myc. 10:10. 1904; 11:51. 1905; 12:12. 1906; and 13:191. 1907.

⁵ See Jour. Myc. 10:10. 1904 11:52. 1905; and 13:191. 1907.

6. PUCCINIA EMACULATA Schw., on *Panicum capillare* L., collected in the vicinity of Lafayette, Ind., by Mr. F. D. Kern, was sown on *Psoralea Onobrychis*, *Viola cucullata*, and *Myosotis palustris*, with no infection. This rust was sown in previous seasons on twenty other species of hosts.⁶

7. PUCCINIA ARUNDINARIAE Schw., on *Arundinaria macrosperma* Michx., collected at Clemson College, S. C., by Mr. H. D. House, was sown on *Myrica cerifera*, *Ilex opaca*, *Smilax hispida*, and *Lysimachia quadrifolia*, with no infection.

8. PUCCINIA SCHEDONNARDI K. & S., on *Schedonnardus paniculatus* (Nutt.) Trel., collected at Boulder, Colo., by Mr. E. Bethel, was sown on *Napaea dioica*, *Sorbus Americana*, *Xanthoxylum Americanum*, *Falcata comosa*, *Triosteum perfoliatum*, *Laciniaria spicata*, and *Aster paniculatus*, with no infection. Like material was sown in previous seasons on eleven other species of hosts.⁷

9. PUCCINIA on *Muhlenbergia tenuiflora* (Willd.) B. S. P., collected at Red Cloud, Neb., by Rev. J. M. Bates, was sown on *Aesculus glabra*, *Lepachys pinnata*, *Napaea dioica*, *Hibiscus Moscheutos*, *Symphoricarpos racemosus*, with no infection.

10. PUCCINIA CRANDALLII Pam. & Hume, on *Festuca confinis* Vasey, collected at Boulder, Colo., by Mr. E. Bethel, was sown on *Draba Caroliniana*, *Bursa Bursa-pastoris*, *Cardamine bulbosa*, *Hydrophyllum Virginicum*, *Mertensia Virginica*, and *Cassia Chamaecrista*, with no infection.

11. PUCCINIA MONTANENSIS Ellis, on *Elymus condensatus* Presl., collected at Glenwood Springs, Colo., by Mr. F. D. Kern and the writer, was sown on *Delphinium tricornis* three times, with no infection. This material was found intermixed with plants of *Delphinium*, species undetermined, but not *D. tricornis*, which exhibited a very abundant development of *Aecidium Delphinii* Barth., and it was assumed that the two forms were alternates. Although the relationship was not established by the attempted culture, yet it cannot be said to be absolutely disproved, as the species of *Delphinium* on which the *Aecidium* occurred was not used.

Another collection of apparently the same species of rust found on *Elymus brachystachys* Scribn. & Ball, at Eldorado Springs, Colo., by the same collectors, was sown on *Delphinium tricornis*, with no infection.

⁶ See Bot. Gaz. 35:12. 1903; Jour. Myc. 8:52. 1902; 10:10. 1904; 12:12. 1906; and 13:192. 1907.

⁷ See Bot. Gaz. 35:11. 1903 and Jour. Myc. 13:192. 1907.

12. PUCCINIA on *Poa longiligula* Scribn. & Will., collected at Boulder, Colo., by Mr. E. Bethel, was sown twice on *Arabis* sp., with no infection. This rust was found so closely associated with aecia of a species of *Arabis*, that it seemed almost certainly to be genetically connected. Healthy plants of apparently the same species of *Arabis* were secured from Colorado, and sowings made, the spores giving strong germination, but without positive results. The grass host was determined by Mr. P. L. Ricker of the U. S. Department of Agriculture.

13. PUCCINIA on *Eriocoma cuspidata* Nutt. (*Oryzopsis cuspidata* Benth.), collected at Glenwood Springs, Colo., by Mr. F. D. Kern and the writer, was sown on *Phacelia bipinnatifida*, *Hypoxis erecta*, *Symphoricarpos racemosus*, *Mertensia* sp (from Colorado), *Triosteum perfoliatum*, *Aquilegia coerulea*, *Thalictrum polygamum*, *Amelanchier Canadensis*, *Hydrophyllum Virginicum*, *Solidago Canadensis*, *Laciniaria spicata*, *Ranunculus recurvatus*, *Cassia Chamaecrista*, and *Psoralea Onobrychis*, with no infection.

14. PUCCINIA on *Agropyron repens* (L.) Beauv., collected in Kenosha county, Wis., by Dr. J. J. Davis, was sown on *Polymnia Canadensis* and *Hydrophyllum Virginicum*, with no infection. This is a leaf rust having close resemblance to *Puccinia rubigo-vera* on cereals.

15. UROMYCES RHYNOSPORA Ellis, on *Rhynchospora alba* (L.) Vahl., collected at London, Ont., by Mr. J. Dearnness, was sown on *Menyanthes trifoliata* and *Decodon verticillatus*, with no infection.

16. UROMYCES JUNCII (Desm.) Tul., on *Juncus Balticus* Willd., collected at Scotia, Neb., by Rev. J. M. Bates, was sown on *Aesculus glabra*, *Symphoricarpos racemosus*, *Napaea dioica*, *Silphium perfoliatum*, *Ranunculus recurvatus*, *Psoralea Onobrychis*, *Polygala Senega*, *Viola cucullata*, *Apocynum cannabinum*, *Polemonium reptans*, *Ambrosia trifida*, *Senecio obovatus*, *Dirca palustris*, *Decodon verticillatus*, and *Bidens frondosa*, with no infection. This rust appears to be morphologically identical with the European *Uromyces Juncii*, which has aecia upon *Pulicaria dysinterica*, a host that was not at hand when sowings were being made. It is clearly distinct from the rust on *Juncus tenuis*, *Uromyces Silphii* (Syd.) Arth., not only on account of its structure, but because it refuses to grow on *Silphium*.

17. UROMYCES OROBI (Pers.) Lev., on *Lathyrus decapetalus* Pursh, collected at Boulder, Colo., by Prof. T. D. A. Cockerell, was sown on *Lathyrus palustris* and *Euphorbia Arkansasana Coloradensis*, with no infection. This rust is believed to be an autoecious species, and the failure to infect *Lathyrus* is not readily explained.

The following species of rusts were successfully grown, and the data supplement that obtained from previous cultures of this series, or that recorded by other American or European investigators. The results with *Gymnosporangium* are the most considerable since the work done by Dr. Roland Thaxter, concluded at the Connecticut Experiment Station in 1890.

1. PUCCINIA ALBIPERIDIA Arth.—Teliosporic material on *Carex crinita* Lam., collected in the vicinity of Lafayette, Ind., by Mr. F. D. Kern, was sown on two plants of *Ribes Cynosbati* on April 16, giving rise to pycnia April 25, and aecia May 6 in one case, and in the other to pycnia April 29, and aecia May 14.⁸

2. PUCCINIA CARICIS-ASTERIS Arth.—Teliosporic material on a narrow leaved *Carex*, collected at Ithaca, N. Y. by Mr. C. W. Edgerton, was sown May 8 on *Aster paniculatus*, *Iris versicolor*, *Ribes Cynosbati*, and *Solidago Canadensis*, with infection only on the first named host, showing pycnia May 16, and aecia May 24. The collection was made adjacent to a clump of *Iris versicolor*, covered with aecia, and there was a possibility of genetic connection, which the culture dispels.

The 24th fascicle of Fungi Columbiani contained a specimen (No. 2366) of *Carex* rust labelled *Puccinia tenuistipes* Rostr., and collected as late as November, 1906, at London, Ont. As this species of rust has its aecia on *Centaurea Jacea*, according to a culture made by Schröter in 1885, and as that host is only occasionally found in North America along the seacoast, and no aecia having been seen on it in these localities, I wrote to Mr. J. Dearness, the collector, for further information and material. He most kindly secured viable material for me from the identical locality. This was sown May 15 on *Ribes Cynosbati*, *Aster cordifolius*, and *Solidago Canadensis*, with no infection. It was sown again May 25 on *Aster cordifolius* and *Erigeron annuus*, this time with the production of a few pycnia by June 10 on the *Aster*, but without formation of aecia. Still a third essay was made by sowing June 5 on *Aster paniculatus*, followed by an abundance of pycnia June 12, and aecia June 19, thus establishing the identity of the rust.

In visiting the locality in the spring of 1907, Mr. Dearness discovered that the host is not *Carex varia*, as published, but *C. rosea* Schk., and he has forwarded ample material to verify the determination.

In justification for the use of the name applied to the rust, Mr. Dearness writes, under date of June 22, 1907, that a collection was sent to the late Mr. J. B. Ellis in September, 1889.

⁸ For previous cultures see Jour. Myc. 8:53. 1902; 10:11. 1904; 11:58. 1905; 12:14. 1906; 13:196. 1907.

who thought it might be a new species and drew up a description. Not long afterward Mr. Ellis sent his notes and material to Dr. Rostrup, of Copenhagen, Denmark, who pronounced it to be *P. tenuistipes* Rostr., by which name it has since been called.⁹

3. *PUCCINIA CARICIS* (Schum.) Reb.—Teliosporic material on *Carex stipata* Muhl. from the vicinity of Lafayette, Ind., brought in by Mr. Frank Vasku, was sown on *Urtica gracilis* April 19, giving rise to pycnia April 27, and aecia May 2; while a similar collection brought in by Mr. F. D. Kern, and sown April 20, gave rise to pycnia April 27, and aecia May 1.

Teliosporic material on *Carex riparia* Curt., collected in November, 1906, at Scotia Junction, Neb., by Rev. J. M. Bates, was sown April 13, on *Ribes floridum* and *R. rubrum*, with no infection. Another sowing was made April 19 on *Urtica gracilis*, giving rise to abundant pycnia April 26, and aecia May 1. A second collection from the same region, taken in March, 1907, was sown April 4 on *Ribes floridum*, with no infection; and again April 19, on *Urtica gracilis*, giving rise, as in the former case, to abundant pycnia April 26, and aecia May 2. Similar material on *Carex riparia* from Iowa gave the same results in 1902.¹⁰

4. *PUCCINIA ANGUSTATA* Peck.—Teliosporic material on *Scirpus atrovirens* Muhl., from the vicinity of Lafayette, Ind., brought in by Mr. Frank Vasku, was sown on *Lycopus Americanus* April 22, giving rise to pycnia April 29, and aecia May 7.¹¹

5. *PUCCINIA FRAXINATA* (Schw.) Arth.—A collection made in November, 1906, on *Spartina cynosuroides* Willd., at Red Cloud, Neb., by Rev. J. M. Bates, was sown on *Fraxinus lanceolata* May 11, giving rise to pycnia May 18. The same collector sent similar material from Grand Island, Neb., in March, 1907, which was sown on *Fraxinus lanceolata* May 25, giving rise to pycnia May 30, and aecia June 13. A like collection taken in April, 1907, similarly sown May 8, gave pycnia May 17. These sowings were all made on cut branches placed in water, which accounts for the slow development and early termination of growth.¹²

⁹ For previous cultures see Jour. Myc. 8:54. 1902; Bot. Gaz. 35:15. 1903.

¹⁰ For previous cultures see Bot. Gaz. 20:270. 1900; 35:16. 1903; Jour. Myc. 8:52. 1902; 12:15. 1906.

¹¹ For previous cultures see Bot. Gaz. 29:273. 1900; Jour. Myc. 8:53. 1902; and 13:196. 1907.

¹² For previous cultures see Bot. Gaz. 29:275. 1900; Jour. Myc. 11:57. 1905; and 12:16. 1906.

6. PUCCINIA SUBNITENS Diet.—Teliosporic material on *Distichlis spicata* (L.) Greene was sent by Rev. J. M. Bates, from Red Cloud, Neb., and sown as follows:

April 10 on *Chenopodium album*; April 19, pycnia; April 23, aecia.
April 10 on *Bursa Bursa-pastoris*; April 26, pycnia; May 1, aecia.
April 10 on *Sarcobatus vermiculatus*; no infection.
April 17 on *Chenopodium album*; April 28, pycnia; May 1, aecia.
April 17 on *Sarcobatus vermiculatus* (two plants); no infection.
April 25 on *Chenopodium album*; May 6, pycnia; May 8, aecia.
April 25 on *Sarcobatus vermiculatus*; no infection.

Another collection of the rust on the same host, obtained by the writer at Ogallala, Neb., was sown on *Chenopodium album* April 29, giving rise to pycnia May 9, and aecia May 13. A sowing at the same time on *Sarcobatus vermiculatus*, and again on two plants June 1, gave no infection. It may be definitely concluded that this species of rust as it exists in Nebraska is not transferable to *Sarcobatus vermiculatus*.¹³

7. PUCCINIA AMPHIGENA Diet.—Teliosporic material on *Calamovilfa longifolia* (Hook.) Hack., collected at Burnett, Neb., by Rev. J. M. Bates, was sown on *Smilax hispida* May 2, giving rise to pycnia May 9, and aecia May 16.¹⁴

8. PUCCINIA PHRAGMITIS (Schum.) Körn.—Teliosporic material on *Phragmites communis* Trin., collected at Scotia Junction, Neb., by Rev. J. M. Bates, was sown on *Rumex crispus* May 1, giving rise to pycnia (date not noted) and aecia May 17.¹⁵

9. PUCCINIA SIMILLIMA Arth.—Teliosporic material on *Phragmites communis* Trin., collected at Scotia Junction, Neb., by Rev. J. M. Bates, was sown on *Rumex crispus*, with no infection, being mistaken for the previously mentioned species. Later it was sown on two plants of *Anemone Virginiana*, still with no infection. It was then sown on *Anemone Canadensis* June 3, giving rise to abundant pycnia June 11, and aecia June 19. This is a confirmation of the restricted range of aecial host, only one species of *Anemone* yet being found that can be infected.¹⁶

10. PUCCINIA AGROPYRI Ellis & Ev.—This is a very common rust of the Rocky mountain region. No culture of it has ever been tried in this country, but a collection made at Bozen, in the Austrian Tyrol, was successfully sown on *Clematis Vitalba*,

¹³ For previous cultures see Bot. Gaz. 35:19. 1903; Jour. Myc. 11:54. 1905; 12:16. 1906; and 13:197. 1907.

¹⁴ For previous cultures see Bot. Gaz. 35:20. 1903; Jour. Myc. 11:57. 1905; and 12:16. 1906.

¹⁵ For previous cultures see Bot. Gaz. 29:269. 1900; and Jour. Myc. 9:220. 1903.

¹⁶ For previous cultures see Bot. Gaz. 35:20. 1903.

by Dr. P. Dietel in 1892.¹⁷ While in the foothills of Colorado this spring Mr. F. D. Kern and the writer observed a plant of *Clematis ligusticifolia* with pycnia just starting, which was growing in the midst of some species of *Agropyron* heavily coated with the wintered telia of *Puccinia Agropyri*. Material was collected for cultures. The host was not in fruit, but is believed to be *A. pseudorepens* S. & S. Sowing of the spores was made on *Viorna Scottii* May 2, sparingly giving rise to pycnia May 15, but failing to develop aecia. A sowing was made May 10 on *Clematis Virginiana*, no plants of *C. ligusticifolia* being available, which gave rise to abundant pycnia May 20, and aecia May 27. This confirms the work by Dr. Dietel, and establishes the identity of the European and American form of the rust, which heretofore rested upon purely morphological grounds. This also shows that *Clematis Virginiana* may be a host for the species, although all collections so far reported on this host pretty certainly belong to the *Bromus* rust, *Puccinia tomipara* Trel.

II. PUCCINIA POCULIFORMIS (Jacq.) Wettst.—Teliosporic material on an undetermined species of *Agropyron*, obtained at Lake Forest, Ill., by Mr. F. D. Kern and the writer, was sown May 17 on *Berberis vulgaris*, showing pycnia May 27, and aecia June 5. Another collection on *Agropyron tenerum* Vasey, and from Scotia Junction, Neb., by Rev. J. M. Bates, was sown in like manner April 24, showing pycnia May 3, and aecia May 14. Aeciospores from the latter culture were sown on *Avena sativa* May 25, giving rise to uredinia June 7.¹⁸

12. PUCCINIA PAMMELII (Trel.) Arth.—Teliosporic material on *Panicum virgatum* L., Collected at Red Cloud, Neb., by Rev. J. M. Bates, was sown on *Euphorbia corollata*, with no infection, and later was sown on *E. marginata* May 31, giving rise to pycnia June 6, and aecia June 12.¹⁹

A number of attempts have been made to grow the teliospores of this rust upon *Euphorbia marginata*, but heretofore without success. In these cases the material was collected in Indiana, where *E. marginata* does not occur, but *E. corollata* is common and abundant. The material used this season gives the reverse condition: it was collected in Nebraska, where *E. corollata* does not occur or is rare, but *E. marginata* is conspicuously abundant. From cultures so far attempted there is reason to think that we have to do with physiological species. Whether

¹⁷ Dietel, Ueber den Generationswechsel von *Puccinia Agropyri* Ell. et Ev.—Oesterr. bot. Zeitschrift 42:261. 1892.

¹⁸ For previous cultures see Jour. Myc. 8:53. 1902; 11:57. 1905; 12:17. 1906; and 13:198. 1907.

¹⁹ For previous cultures see Proc. Ind. Acad. Sci. for 1901:284. 1902; Jour. Myc. 11:56. 1905; 12:16. 1906.

any morphological distinctions exist is yet uncertain, but none has yet been detected.

13. *UROMYCES ACUMINATA* Arth.—Teliosporic material on *Spartina cynosuroides* Willd., collected at St. Paul, Neb., by Rev. J. M. Bates, was sown twice on thrifty plants of *Lysimachia quadrifolia*, with no infection. It was sown on *Steironema ciliata* May 14, giving rise to strongly developed pycnia May 22, and aecia May 27; while a second sowing May 30, gave pycnia June 6, and aecia June 11.²⁰

These results confirm the studies of previous seasons, showing that the rust called by this name in different sections of the country should be segregated into distinct species, or else into physiological species. More observations and material for cultures are required from all parts of the region east of the Mississippi river.

14. *UROMYCES SCIRPI* (Cast.) Burr.—Teliosporic material on *Scirpus fluviatilis* (Torr.) A. Gray, collected at St. Paul, Neb., by Rev. J. M. Bates, was sown on *Oxypolis rigidus*, with no infection. It was sown on *Cicuta maculata* May 3, giving rise to abundant pycnia May 13, and aecia May 20, thus confirming the work of last season.²¹

15. *UROMYCES SILPHI* (Syd.) Arth.—Teliosporic material on *Juncus tenuis* Willd., collected at Red Cloud, Neb., by Rev. J. M. Bates, was sown on *Silphium perfoliatum* April 23, giving rise to pycnia May 4, and aecia May 11. Similar material sent by the same collector from Grand Island, Neb., was sown on another plant of the same host May 31, giving rise as before to pycnia June 12, and aecia June 17. These results well confirm the work of last year.²²

16. *PHRAGMIDIUM SPECIOSUM* Fr.—Teliosporic material on *Rosa pratincola* Green (same as previously reported under the name *R. Arkansana*), collected in a meadow at Eldorado Springs (Boulder county), oClo., by the writer, was sown on *Rosa pratincola* May 20, giving rise to pycnia May 27, and aecia June 1.²³

17. *GYMNOSPORANGIUM JUNIPERI - VIRGINIANAE* Schw.—Teliosporic material on *Juniperus Virginiana* L., collected at Dayton, Ind., by Mr. F. D. Kern, was sown on *Crataegus punctata*, with no infection, and on a cultivated apple, *Malus Malus*,

²⁰ For previous successful and unsuccessful cultures see Jour. Myc. 12:24. 1906; 13:193. 1907.

²¹ For previous cultures and discussion see Jour. Myc. 13:199. 1907.

²² For previous cultures see Jour. Myc. 13:202. 1907.

²³ For previous cultures see Bot. Gaz. 35:17. 1903; Jour. Myc. 11:53. 1905.

April 12, giving rise to abundant pycnia April 24, but injury to the leaves prevented formation of aecia.²⁴

18. GYMNOSPORANGIUM GLOBOSUM Farl.—Teliosporic material collected as in the previous instance was sown on the Wealthy variety of *Malus Malus* April 12, giving rise to a few pycnia April 30, and afterward to aecia first observed July 12, although appearing much earlier.²⁵

19. GYMNOSPORANGIUM NELSONI Arth.—Teliosporic material on *Juniperus scopulorum* Sarg., collected at Boulder, Colo., by E. Bethel, was sown on *Amelanchier intermedia* Spach (*A. Botryapium* DC., as given in Britton & Brown's Illustrated Flora), April 16, giving rise to pycnia April 25, but further development stopped by injury to leaves.

Another collection made at the same place two weeks later by Mr. F. D. Kern was sown on *A. Canadensis* (L.) Medic. (plant from the Arnold Arboretum), April 30, giving rise to pycnia May 8, and aecia May 29. Another sowing was made on another plant of the same sort May 15, which gave a great abundance of pycnia May 22, and a fine development of aecia a month later, June 24. The above cultures were on leaves only. The same material was now sown on both leaves and fruit of *Amelanchier erecta* Blanch. (plants received from Edw. Gillett, of Southwick, Mass., under name of *A. Canadensis*, but identified by Mr. W. H. Blanchard as typical *A. erecta*), May 13, and gave pycnia on upwards of thirty fruits and many leaves May 20, and the first aecia June 5, reaching full and normal maturity June 24. Another sowing was made on leaves of *Sorbus Americana* May 15, which gave rise to pycnia in fair amount May 21, and normally formed aecia, especially on the rachis and midribs, June 24.

The above results confirm and much extend the somewhat uncertain work of last season.²⁶ It leaves no further doubt that *Roestelia Nelsoni* Arth. should be counted a synonym of *G. Nelsoni* Arth., as suggested in the original publication of the name.

20. GYMNOSPORANGIUM CLAVIPES C. & P.—Teliosporic material on *Juniperus Sibirica* Burgsd., obtained at Lake Forest, Ill., by Mr. F. D. Kern, was sown on leaves of *Amelanchier intermedia* April 10, giving rise to a few pycnia May 1, but without maturing aecia. Another sowing was made on fruit of *A. erecta*, also giving rise to a few pycnia June 5, but not maturing aecia. Checking of development was doubtless due in both instances to inherent weakness of the hosts. A sowing was made on *Malus coronaria* and *Cataegus* sp., with no infection.

²⁴ For previous cultures see Jour. Myc. 12:13. 1906; 13:200. 1907.

²⁵ For previous cultures see Proc. Am. Acad. Sci. 22:263. 1887; Bot. Gaz. 14:167. 1889; Jour. Myc. 13:200. 1907.

²⁶ See Jour. Myc. 13:203. 1907.

Cultures of this species were made by Prof. W. G. Farlow,²⁷ in 1883, from teliosporic material on *Juniperus Virginiana*, which gave rise to pycnia on leaves of *Malus Malus*, *Aronia arbutifolia* and *Amelanchier Canadensis*, but failed to mature aecia. Cultures were also made by Dr. Roland Thaxter²⁸ in 1886, from similar material, producing pycnia on leaves of *Malus Malus*, and both pycnia and well developed aecia on *Amelanchier Canadensis*, especially on stems and midribs. A difference in the source of material used in the earlier cultures, and for the present year, is worth noting. The former was taken from *Juniperus Virginiana*, the red cedar, while the latter came from *Juniperus Sibirica*, the dwarf juniper. This is the only species of *Gymnosporangium* so far known to inhabit both the true cedars and the true junipers, and the situation should receive careful study. Either the species is a more generalized one than usual, which is not borne out by the geographical distribution, or it is an aggregate of two closely related forms thus far confused.

21. *GYMMOSPORANGIUM CLAVARIAEFORME* (Jacq.) DC.—Teliosporic material on the stems of *Juniperus Sibirica* Burgsd., obtained at Lake Forest, Ill., by Mr. F. D. Kern, was sown on leaves of *Malus Malus* (Bechtel Crab variety), with no infection, and also on leaves of *Amelanchier intermedia* April 11, giving rise to a few pycnia April 20, but to no further development owing to withering of the leaves.

The first culture of this species was made in Denmark, by Oersted, in 1867. The numerous subsequent cultures by European investigators are summarized by Klebahn.²⁹ The only definite cultures with American material were made by Dr. Roland Thaxter,³⁰ in 1886 and 1887. He grew an abundance of pycnia and aecia on *Crataegus tomentosa* and *Amelanchier Canadensis*. Uncertain results were obtained in trials by Prof. L. H. Pammel.³¹

22. *GYMNASPORANGIUM NIDUS-AVIS* Thax.—Teliosporic material on *Juniperus Virginiana* L., obtained at Lake Forest, Ill., by Mr. F. D. Kern, was sown on *Amelanchier intermedia*, with no infection, and also on *Malus Malus* (Whitney Crab variety April 10, which gave rise to a few pycnia April 17, and aecia May 11, a period of incubation shorter than for most *Gymnosporangia*. The spores for sowing were taken from large sori on the branches. The only previous cultures of this species were made by Dr.

²⁷ Proc. Am. Acad. Sci. 20:313. 1885.

²⁸ Bot. Gaz. 11:236. 1886; Proc. Am. Acad. Sci. 22:264. 1887.

²⁹ Die wirtswechselnden Rostpilze, pages 339-345.

³⁰ Proc. Am. Acad. Sci. 22:262. 1887; and Bot. Gaz. 14:166. 1889.

³¹ Bull. Iowa Exper. Sta. 84:33. 1905.

Roland Thaxter,³² in an extensive series running from 1886 to 1890, inclusive. He grew it on *Amelanchier Canadensis* in great abundance, showing both pycnia and aecia, and in one instance pycnia were formed on the common apple, but failed to develop further. Thaxter also noted the early development of pycnia and aecia.

The following eight species have now been grown in cultures for the first time, so far as the writer knows. The two cases of amphispores and the one autoecious species resulted as anyone might have taken for granted, but in the other five cases the results are wholly unpredicted, and represent very material advancement in the knowledge of American heteroecious rusts.

1. PUCCINIA VEXANS Farl.—Material bearing both teliospores and amphispores on *Atheropogon curtispendus* (Michx.) Fourn. (*Bouteloua racemosa* Lag.), was sent from Boulder, Colo., by Mr. E. Bethel, and gave good germination for the amphispores, but the teliospores refused to grow. Sowing was made on *Atheropogon curtispendus* May 29, and uredinia were observed June 21, although they may have appeared earlier and been overlooked. The amphispores were the characteristic, dark-colored, thick-walled and four-pored form, while the urediniospores, to which they gave rise, had the usual light-colored, thin-walled and eight-pored appearance. The difference between the resting form (amphispore) and active form of the urediniospores belonging to this species is very striking. This is the second time, as far as the writer knows, that amphispores of this species have been seen to germinate.

2. PUCCINIA CRYPTANDRI Ellis & Barth.—Amphisporic material on *Sporobolus cryptandrus* (Torr.) A. Gray, obtained at Manitou, Colo., by Mr. F. D. Kern and the writer, was sown on a plant of the same species of grass May 9, and uredinia appeared May 24. In this case the difference between the resting or amphisporic form of the urediniospores and the active or summer form is not so marked as in the preceding species, and yet there is no mistaking one for the other.

3. PUCCINIA OBTECTA Peck.—Teliosporic material on *Scirpus Americanus* Pers., obtained near Lafayette, Ind., by Mr. F. D. Kern, was sown on *Urtica gracilis*, and *Silphium perfoliatum*, with no infection, and afterward on *Bidens frondosa* June 5, giving rise to a few pycnia June 19, and aecia first noticed July 6, but probably opening earlier. Another sowing was made on *B. frondosa* and also on *B. connata* June 24, both showing a good development of pycnia July 1, and aecia July 6.

³² Bot. Gaz. 11:238. 1886; Proc. Am. Acad. Sci. 22:264. 1887; Bot. Gaz. 14:167. 1889; and Bull. Conn. Exper. Sta. 107:5. 1891.

The telial stage is common and well known throughout the United States and extending into Mexico, but the aecial stage has rarely been collected. Collections of aecia are in the writer's herbarium from Nebraska and Wisconsin, and in the literature one is also recorded from Illinois. On the basis of a single collection on *Bidens frondosa* Professor Burrill separated it as a special form, and De Toni, in the seventh volume of Saccardo's *Sylloge*, supplied the name *Aecidium compositarum* var. *Bidentis* Burrill.

4. PUCCINIA ON CAREX STENOPHYLLA.—Teliosporic material of this rust collected at Boulder, Colo., by the writer, was sown on *Solidago Canadensis* and *Baptisia leucantha*, with no infection.

It was at this point in the work that a brief note of observation was seen in Dr. W. Tranzschel's second report on "Beiträge zur Biologie der Uredineen." This is a translation in full: "In July, 1900, I found in Turkestan, near Irkeschtam on the Chinese border, the *Aecidium Dracunculi* Thüm. on *Artemisia Dracunculus* in great abundance. Associated with the affected *Artemisia* grew *Carex stenophylla* Wahlb., on which was found uredosori." Accepting this as a hint, the Colorado material was now sown on *Artemisia dracunculoides*. As no potted plant was available, a sowing was made in the open, giving no infection, and another in the greenhouse on a cutting placed in water. The latter attempt gave very abundant and unequivocal results. The sowing was made May 31, and pycnia appeared June 6, followed by aecia June 15, both numerous and finely developed.

The type collection of this *Aecidium* was made in Siberia, at Minussinsk, also on the Chinese border, but about a thousand miles northeast of the locality where it was found by Dr. Tranzschel. This collection was distributed in Thuemen's *Mycotheca Universalis*, No. 1223. A collection of aecia on *Artemisia dracunculoides* from Nebraska was distributed in Ellis & Everhart's *Fungi Columbiani*, No 1664. A careful comparison shows no apparent difference between the Asian and American collections, and the two are accepted as the same species.

As a name and description seem to be demanded for this species, the following are submitted:

***Puccinia universalis* nom. nov. (*Aecidium Dracunculi* Thuem., not *Puccinia Dracunculi* Auers.)**

O. Pycnia chiefly epiphyllous, numerous in orbicular groups, punctiform, honey-yellow, rather inconspicuous; subepidermal, slightly depressed-globose, 100-160 μ broad by 90-112 μ high; ostiolar filaments 40-80 μ long.

I. Aecia chiefly hypophyllous, crowded in orbicular groups opposite the pycnia, 1-3 mm. across, peridia cylindrical, 0.5 mm. high, margin usually erect, erose, peridial cells rhomboidal, 20-30 μ long, overlapping,

inner wall medium thick, 3-4 μ , verrucose, outer wall thicker, 5-9 μ , smooth, striate; aeciospores globoid, small, 12-18 by 15-21 μ ; wall very thin, 0.5-1 μ , nearly colorless, very minutely granular.

On *Artemisia dracunculoides* Pursh, Colorado, Nebraska; *A. Canadensis* Michx., Iowa, Nebraska; *A. frigida* Willd., Montana; *A. kansana* Britt., Nebraska. Type on *A. Dracunculus* L., Western Siberia.

II. Uredinia epiphyllous, scattered, oblong, 0.2-0.5 mm. long, rather early naked, cinnamon-brown, ruptured epidermis conspicuous; urediniospores broadly ellipsoid, 15-19 by 20-26 μ , wall cinnamon brown, 1-1.5 μ thick, rather finely echinulate, pores 2, equatorial.

III. Telia epiphyllous, scattered, roundish or oblong, 0.1-0.3 mm. wide by 0.2-1.2 mm. long, early naked, pulverinate, ruptured epidermis noticeable; teliospores clavate-oblong, 16-26 by 35-52 μ , wall dark chestnut-brown, lighter and about 1.5-2 μ thick below, thicker above, 7-12 μ , smooth; pedicel tinted, one-half length of spore, or more.

On *Carex stenophylla* Wahl., Colorado, Nebraska, Montana.

5. PUCCINIA ON CAREX LONGIROSTRIS.—Field observations by Dr. E. W. Olive, and material furnished by him, including aecia host plants, supplied the entire basis for the result reported under this number.

Teliospores from *Carex longirostris* Torr. were sown June 4 on *Aster paniculatus*, *Erigeron annuus*, *Solidago Canadensis*, *Ribes Cynosbati*, and *Phryma leptostachya*, with no infection, except on *Phryma*, which showed pycnia June 10 in great abundance, and aecia June 15. The development was exceptionally strong and characteristic.

No rust has heretofore been reported on this species of *Carex*. The aecial stage was first collected at Spirit Lake, Iowa, by Dr. B. D. Halsted, in 1886, and has since been reported from Minnesota and Nebraska, and found by Dr. Olive this season at Madison, Wis. A description of the species in its several spore-stages is appended:

Puccinia Phrymae (Halst.) nom. nov. (*Aecidium Phrymae* Halst., Jour. Myc. 2:52. 1886.)

O. Pycnia amphigenous, few, crowded in small groups, inconspicuous, honey-yellow, becoming blackish-brown, slightly flattened globoid, 77-110 μ in diameter by 65-80 μ high; ostiolar filaments 40-50 μ long.

I. Aecia hypophyllous, gregarious, in large open groups on discolored spots 4-10 mm. across, very short, 0.2-0.3 mm. in diameter, pale yellow; peridia colorless, margin recurved, erose, peridial cells rhomboidal in longitudinal section, overlapping, inner wall thin, about 1 μ , finely verrucose, outer wall thicker, 3-4 μ , striate, smooth; aeciospores globoid, 12-16 by 14-19 μ , wall pale yellow, thin, 1 μ or less, finely verrucose.

On *Phryma leptostachya* L., Iowa, Wisconsin, Nebraska, Minnesota. Type from Spirit Lake, Iowa.

II. Uredinia hypophyllous, scattered, round or oblong, early naked, ruptured epidermis noticeable; urediniospores broadly ellipsoid, 15-18 by 18-20 μ , wall cinnamon-brown, 1-1.5 μ thick, finely and rather sparsely echinulate, pores 2, in upper part.

III. Telia hypophyllous, scattered, round or oblong, 0.2-0.4 mm. wide by 0.3-0.8 mm. long, early naked, dark chocolate-brown, pulvinate, ruptured epidermis noticeable; teliospores clavate-oblong, 12-15 by 35-45 μ , rounded or obtuse at apex, usually narrowed below, wall chestnut-brown, concolorous, 1-1.5 μ thick, much thicker, 9-13 μ : pedicel about length of spore or less, tinted.

On *Carex longirostris* Torr., Wisconsin.

6. PUCCINIA MUTABILIS Ellis & Gall.—While collecting for a few days in Colorado about the first of May, wintered-over teliospores were found on a number of species of *Allium*, in most cases not accurately determined for want of the inflorescence. In a few cases young leaves of the season showed freshly formed uredinia, and in one instance immature telia were observed beside the uredinia, evidently arising from the same mycelium. A few very young aecia, well isolated from other spore forms were also found. As it was clearly too early in the season to have had aecia mature and reinfect the host, and in this manner give rise to the uredinia, the question arose whether the aecia did not belong to some heteroecious species, while the uredinia and telia represented a species without aecia. Further search in the field brought to light some leaves which without question had remained alive over winter. In one case the dead tip of such a leaf bore telia of last year's growth, and on the adjoining green part of the leaf uredinia were forming. This seemed to show that the early uredinia were derived from wintered-over mycelium, but it left the question of the origin of the aecia unsolved.

Teliosporic material on what was believed to be *Allium reticulatum* Fraser, was obtained by the writer at Eldorado Springs, Colo., and sown on *Allium recurvatum* Rydb., May 18, giving rise to pycnia June 3, and aecia June 7. The life cycle of the rust with all spore forms is therefore established, although it is clearly possible in exceptional cases for the mycelium to be carried over the winter in leaves that retain their vitality and thus start the rust in the spring at the uredinial stage.

7. GYMNASPORANGIUM BETHELI Kern.—Teliosporic material or *Juniperus scopulorum* Sarg., obtained at Boulder, Colo., by Mr. F. D. Kern, was sown on *Crataegus* sp. (received from the Arnold Arboretum) April 30, showing pycnia May 8, and aecia June 5, the aecia being fully matured by June 17. Another sowing was made on *Crataegus coccinea* May 15, showing pycnia May 21, and aecia June 24. Another sowing on *Crataegus punctata* May 15, gave pycnia May 21, but the leaves withered before aecia had formed. Another sowing on *Sorbus Americana* May 21, gave rise to numerous pycnia May 29, and an equal abundance of well formed aecia July 25.

Similar material obtained at Wolcott, about one hundred miles west of Boulder, was sown on *Crataegus cordata* (Mill.) Ait. May 5, on a tree out of doors, giving rise to pycnia May 17, and aecia July 1. Another sowing on *Sorbus Americana* May 15, gave a large number of pycnia May 24, and aecia well formed July 25. A sowing on *Amelanchier erecta* gave no infection.

All the foregoing sowings were on the leaves. The ample success attained admits of no question that the aecia, recently described under the name *Roestelia Betheli* Kern, do in fact belong to the large gall form of cedar rust, as suggested by Mr. E. Bethel³³ from field observations.

8. GYMNOSPORANGIUM INCONSPICUUM Kern. — Teliosporic material on *Juniperus Utahensis* (Engelm.) Lemmon, obtained from the type locality at Glenwood Springs, Colo., by Mr. F. D. Kern and the writer, was sown on the leaves of *Crataegus* sp., *Amelanchier Canadensis*, and *Pyrus communis*, with no infection. It was afterward sown on fruit of *Amelanchier erecta* May 10, which gave rise to abundance of pycnia May 24, and aecia June 15, the aecia being mature by June 19. The affected areas of the fruit became somewhat swollen, and of a yellowish white color, making them conspicuous. The aecia prove to be identical with *Roestelia Harknessianoides* Kern, and thus confirm the inference drawn from field observations.³⁴ It is an interesting fact that while the telia of this species of rust are very evanescent, the aecia persist and may be found on mummified fruits the year following infection, so that it is likely to become common in herbaria.

SUMMARY.

The following is a complete list of successful cultures made during the season of 907. It is divided into two series: species previously reported by the writer or other investigators, and species now reported for the first time.

A Species previously reported.

1. PUCCINIA ALBIPERIDIA Arth. — Teliospores on *Carex crinita* Lam., sown on *Ribes Cynosbati* L.

2. PUCCINIA CARICIS-ASTERIS Arth. — Teliospores on *Carex rosea* Schk., sown on *Aster cordifolia* L., and on *Carex* sp., sown on *Aster paniculatus* Lam.

3. PUCCINIA CARICIS (Schum.) Reb. — Teliospores on *Carex stipata* Muhl., and on *C. riparia* Curt., sown on *Urtica gracilis* Ait.

³³ Bull. Torrey Club 34:460. 1907.

³⁴ Bull. Torrey Club 34:463. 1907.

4. PUCCINIA ANGUSTATA Peck. — Teliospores on *Scirpus atrovirens* Muhl., sown on *Lycopus Americanus* Muhl.

5. PUCCINIA FRAXINATA (Schw.) Arth. — Teliospores on *Spartina cynosuroides* Willd., sown on *Fraxinus lanceolata* Borck.

6. PUCCINIA SUBNITENS Diet. — Teliospores on *Distichlis spicata* (L.) Greene, sown on *Chenopodium album* L., and *Bursa Bursa-pastoris* (L.) Britt.

7. PUCCINIA AMPHIGENA Diet. — Teliospores on *Calamovilfa longifolia* (Hook) Hack., sown on *Smilax hispida* Muhl.

8. PUCCINIA PHRAGMITIS (Schum.) Körn. — Teliospores on *Phragmites communis* Trin., sown on *Rumex crispus* L.

9. PUCCINIA SIMILLIMA Arth. — Teliospores on *Phragmites communis* Trin., sown on *Anemone Canadensis* L.

10. PUCCINIA AGROPYRI Ellis and Ev. — Teliospores on *Agropyron pseudorepens* S. & S., sown on *Viorna Scottii* (Porter) Rydb., and on *Clematis Virginiana* L.

11. PUCCINIA POCULIFORMIS (Jacq.) Wettst. — Teliospores on *Agropyron tenerum* Vasey, sown on *Berberis vulgaris* L., and aeciospores from this culture sown on *Avena sativa* L.

12. PUCCINIA PAMMELII (Trel.) Arth. — Teliospores on *Panicum virgatum* L., sown on *Euphorbia marginata* Pursh.

13. UROMYCES ACUMINATUS Arth. — Teliospores on *Spartina cynosuroides* Willd., sown on *Steironema ciliata* (L.) Raf.

14. UROMYCES SCIRPI (Cast.) Burr. — Teliospores on *Scirpus fluviatilis* (Torr.) A. Gray, sown on *Cicuta maculata* L.

15. UROMYCES SILPHII (Syd.) Arth. — Teliospores on *Juncus tenuis* Willd., sown on *Silphium perfoliatum* L.

16. PHRAGMIDIUM SPECIOSUM Fr. — Teliospores on *Rosa pratincola* Greene, sown on same host.

17. GYMNASPORANGIUM JUNIPERI-VIRGINIANAE Schw. — Teliospores on *Juniperus Virginiana* L., sown on *Malus Malus* (L.) Britt.

18. GYMNASPORANGIUM GLOBOSUM Farl. — Teliospores on *Juniperus Virginiana* L., sown on *Malus Malus* (L.) Britt.

19. GYMNASPORANGIUM NELSONI Arth. — Teliospores on *Juniperus Scopulorum* Sarg., sown on *Amelanchier intermedia* Spach, *A. Canadensis* (L.) Medic., *A. erecta* Blanch., and *Sorbus Americana* Marsh.

20. GYMNOSPORANGIUM CLAVIPES C. & P.—Teliospores on *Juniperus Sibirica* Burgsd., sown on *Amelanchier intermedia* Spach, and *A. erecta* Blanch.

21. GYMNOSPORANGIUM CLAVARIAEFORME (Jacq.) DC.—Teliospores on *Juniperus Sibirica* Burgsd., sown on *Amelanchier intermedia* Spach.

22. GYMNOSPORANGIUM NIDUS-AVIS Thax.—Teliospores on *Juniperus Virginiana* L., sown on *Malus Malus* (L.) Britt.

B. Species reported now for the first time.

1. PUCCINIA VEXANS Farl.—Amphisporos on *Atheropogon curtipendulus* (Michx.) Fourn., sown on same host.

2. PUCCINIA CRYPTANDRI Ellis & Barth.—Amphisporos on *Sporobolus cryptandrus* (Torr.) A. Gray, sown on same host.

3. PUCCINIA OBTECTA Peck.—Teliospores on *Scirpus Americanus* Pers., sown on *Bidens frondosa* L., and *B. connata* Muhl.

4. PUCCINIA UNIVERSALIS Arth.—Teliospores on *Carex stenophylla* Wahl., sown on *Artemisia dracunculoides* Pursh.

5. PUCCINIA PHRYMAE (Halst.) Arth.—Teliospores on *Carex longirostris* Torr., sown on *Phryma leptostachya* L.

6. PUCCINIA MUTABILIS Ellis & Gall.—Teliospores on *Allium reticulatum* Fraser, sown on *A. recurvatum* Rydb.

7. GYMNOSPORANGIUM BETHELI Kern.—Teliospores on *Juniperus scopulorum* Sarg., sown on *Crataegus coccinea* L., *C. punctata* Jacq., *C. cordata* (Mill.) Ait., and *Sorbus American* Marsh.

8. GYMNOSPORANGIUM INCONSPICUUM Kern.—Teliospores on *Juniperus Utahensis* (Engelm.) Lemmon, sown on *Amelanchier erecta* Blanch.

NORTH AMERICAN SPECIES OF AGARICACEAE.

A. P. MORGAN.

THE MELANOSPORA. (Continued).

(Continued from page 255).

VII. HYPHOLOMA FRIES, SYST. MYC. I, 1821.

Pileus fleshy to submembranaceous, convex or campanulate then expanded; the veil marginal, woven into a web which adheres to the margin of the pileus. *Stipe* tubulous and stuffed or generally hollow, fragile to firm and tough, mostly fibrillose or scaly. *Lamellae* adnexed or adnate, the color at maturity becoming some shade of brown; spores brown or purple-brown.

The species usually caespitose, growing upon and around old decaying stumps and trunks.

1. APPENDICULATAE. *Pileus* submembranaceous, thin and fragile, hygrophanous; the surface glabrous, often rugulose, scarcely striatulate. *Stipe* fistulous, fragile, glabrous or silky fibrillose, nearly always white. *Lamellae* usually narrow and close or crowded.

The species of this tribe are to be distinguished from those of *Psilocybe* chiefly by their caespitose habit and the more evident veil.

a. *Lamellae* at first white or whitish.

1. HYPHOLOMA APPENDICULATUM BULLIARD, HERB. FR. 1788. A. (HYPHOLOMA) SACCHARINOPHILUS PECK, 25 N. Y. REP. 1872.

Pileus submembranaceous, ovoid then convex and expanded, glabrous, hygrophanous, when dry rugose and somewhat atomate, at first brown becoming tawny or pale ochre; the flesh thin, fragile, concolorous. *Stipe* equal, fistulous, glabrous, white, pruinose at the apex. *Lamellae* narrow, close adnexed, at first whitish then incarnate-brown; spores pellucid brown, elliptic, 6-8 x 3-4 mic.

Densely caespitose, growing on old stumps and trunks; New England to the Pacific Coast. *Pileus* 4-8 cm. in diameter; *stipe* 6-9 cm. long, 3-6 mm. thick.

2. HYPHOLOMA INCERTUM PECK, 29 N. Y. REP. 1876. HYPHOLOMA CUTIFRACTUM PECK, BULL. TORR. CLUB, 1895. STROPHARIA IRREGULARIS PECK, BULL. TORR. CLUB, 1900.

Pileus fleshy, convex or subcampanulate then expanded, often rugulose, hygrophanous, whitish with the center yellowish,

sometimes purplish-tinted around the margin; the flesh thin, fragile; the veil white, flocculent, fugacious. Stipe equal, fistulous, easily splitting, whitish, pruinose at the summit. Lamellae narrow, close, whitish then rosy-brown; spores purplish-brown, elliptic, $7-8 \times 5$ mic.

Subcaespitose; growing on the ground around old stumps in dooryards, orchards, etc. New York westward to Kansas. Pileus 3-6 cm. in diameter; stipe 6-10 cm. high, 2-4 mm. thick.

3. *HYPHOLOMA ROYSTONIAE*, *GYMNOCHILUS ROYSTONIAE* EARLE, HONGOS CUBANOS, 1906.

Pileus fleshy, convex then expanded, obtuse, glabrous, somewhat reticulate and striatulate, hygrophanous, pallid tinged with purple, becoming whitish when dry; the flesh thin and fragile; the veil of whitish filaments soon disappearing. Stipe short, fistulous, glabrous, white, with a mycelioid base. Lamellae moderately broad, close, adnexed, at first pallid, at length purple-brown; spores elliptic, $7-8 \times 4-5$ mic.

Subcaespitose, growing on rotten trunks of *Roystonia*; Cuba, Earle. Pileus 1-3 cm. in diameter; stipe 2 cm. long, 2 mm. thick.

4. *HYPHOLOMA MADEODISCUM* PECK, 38 N. Y. REP. 1884.

Pileus thin, convex becoming nearly plane, hygrophanous, when moist reddish brown, pale ochraceous when dry, the disk rugulose; the veil whitish, at first concealing the lamellae, at length depending in fragments from the margin of the pileus. Stipe tapering upward from a slightly thickened base, fistulous, white, somewhat silky. Lamellae close, slightly emarginate, at first whitish, becoming brown; spores brown, elliptic, $9-10 \times 6$ mic.

Growing on decaying wood in wet places; New York, Peck. Pileus 3-5 cm. in diameter; stipe 5-7 cm. long, 4-6 mm. thick. "I have not seen the plant growing in tufts."

5. *HYPHOLOMA MUSAE*, *GYMNOCHILUS MUSAE* EARLE, HONGOS CUBANOS, 1906.

Pileus convex then expanded, silky, striatulate, hygrophanous, pale ochraceous tinged with purple-brown, becoming pallid or whitish when dry; the flesh thin, fragile, watery; the veil delicate, whitish, appendicular and evanescent. Stipe slender, fragile, hollow, white, glabrous, but with the apex slightly mealy and with a mycelioid base. Lamellae narrow, crowded, adnexed, at first whitish, becoming purple-brown; spores elliptic, $6-8 \times 4-5$ mic.

Subcaespitose; growing on old leaves of *Musa*; Cuba, *Earle*. Pileus 1-3 cm. in diameter; stipe 3-6 cm. long, 2 mm. thick.

6. *HYPHOLOMA CAESPITOSA*, *GYMNOCHILUS CAESPITOSUS* EARLE, *HONGOS CUBANOS*, 1906.

Pileus fleshy, convex then expanded, glabrous, faintly striate, hygrophanous, at first cinnamon-brown, becoming pale gray, darker in the center; the flesh thin pallid; the veil white, appendicular and evanescent. Stipe long, rather stout, hollow, flocculose, white. Lamellae adnexed, at first of a dirty white color, becoming dark brown, spores elliptic, about 7×5 mic.

Densely caespitose, forming large clumps at the foot of a trunk in a garden; Cuba, *Earle*. Pileus 3-5 cm. in diameter; stipe 6-12 cm. long, 4-6 mm. thick.

b. Lamellae colored from the first.

7. *HYPHOLOMA CORONATUM* FRIES, *HYM. EUR.* 1874; *ICONES SEL.* 134, *HYPHOLOMA SUBAQUILUM* BANNING, 44 N. Y. REP. 1890; *HYPHOLOMA CALIFORNICUM* EARLE, *MYC. STUDIES*, I, 1902.

Pileus submembranaceous, convex then explanate, obtuse, glabrous, hygrophanous, pale, umber, darker in the center and variegated with darker spots; the margin crowned by the dentiform appendiculate, white veil. Stipe slender, fistulous, smooth and glabrous, white. Lamellae narrow, crowned, adnate, carneopurple or umber; spores umber, elliptic-oblong, $5-6 \times 3-4$ mic.

Caespitose; growing at the base of trunks in woods; Pacific Coast Cat.; Maryland, *Banning*. Pileus 3-6 cm. in diameter; stipe 5-8 cm. long, 3-5 mm. thick.

8. *HYPHOLOMA MUTABILE*, *AGARICUS MUTABILIS*, *FLORA DANICA*, 774; *AGARICUS VIOLACEO-LAMELLATUS*, *FLORE FRANCAISE* II, 1805; *AGARICUS CANDOLLIANUS* FRIES, *OBS.* II. 1818.

Pileus somewhat fleshy, companulate then convex and explanate, obtuse, glabrous, hygrophanous, at first brown, then becoming white with the center ochraceous, the flesh thin whitish. Stipe tapering upward from a slightly thickened base, fistulous, fragile, subfibrillose, white, the apex striate. Lamellae narrow, close, rounded behind, adnexed, at first violaceous then cinnamon-brown; spores brown, elliptic, 8×4 mic.

Caespitose; growing on the ground in woods, New York west to Nebraska. Pileus 5-10 cm. in diameter; stipe 7-9 cm. long, 3-6 mm. thick. The distinguishing feature of the species is the violet color of the young lamellae.

9. *HYPHOLOMA CAMPESTRE*, *GYMNOCHILUS CAMPESTRIS* EARLE, *HONGOS CUBANOS*, 1906.

Pileus fleshy, fragile, campanulate then expanded, glabrous, hygrophanous, at first grayish brown, then argillaceous, darker in the center, becoming reticulate when dry and striatulate. Stipe fistulous, fragile, white, glabrous except at the summit where it is striate and floccose-pulverulent. Lamellae narrow, close, adnexed, at first grayish-brown, at length dark brown; spores elliptic, $8-10 \times 5-6$ mic.

Gregarious; growing in grassy grounds; Cuba, *Earle*. Pileus 2-5 cm. in diameter; stipe 4-6 cm. long, 2-4 mm. thick. Much resembling *H. incertum*.

10. *HYPHOLOMA ARTRIFOLIUM* PECK, *BULL. TORR. CLUB*, 1896; *SYLLOGE XIV*, 152.

Pileus submembranaceous, convex or hemispheric then expanded, usually umbonate, radiately rugulose, hygrophanous, when wet wood-brown, when dry pale yellow or cream-color; the veil fugacious. Stipe slender, fistulous, fibrillose, pallid or cream-color. Lamellae rather distant, adnate, at first pale brown, at length dark brown or nearly black; spores dark brown, elliptic, $10-11 \times 5$ mic.

Subcaespitose; growing among bushes; California, *McClatchie*. Pileus 3-5 cm. in diameter; stipe 3-6 cm. long, 3-6 mm. thick.

11. *HYPHOLOMA HYDROPHILUM*, *SYLLOGE V*, 1041; *COOKE, ILLUSTR.* 605; *BOLBITIUS HYDROPHILUS* FRIES, *HYM. EUR.* 1874; *AGARICUS HYDROPHILUS* BULLIARD, *HERB. FR.* 1791.

Pileus submembranaceous, convex then expanded, subrepand, rugulose, hygrophanous, dark brown, becoming tawny when dry, the veil extremely fugacious, often none. Stipe fistulous, somewhat curved and often compressed, appressedly fibrillose, ferruginous, becoming pallid. Lamellae close, adnexed, cinnamon brown; spores ferruginous, $7-8 \times 3-4$ mic.

Densely caespitose; growing about the base of trunks; Michigan, *Kauffman*. Pileus 1-2 cm. in diameter; stipe 5-6 cm. long, 2-4 mm. thick.

II. *FASCICULARIAE*. *Pileus fleshy, rather tough, not hygrophanous; the surface smooth and glabrous, dry or slightly viscid, bright-colored. Stipe long, thick, tough, stuffed or hollow, usually fibrillose, bright-colored.*

a. *Pileus smooth and dry, not viscid.*

12. *HYPHOLOMA FASCICULARE*, *AGARICUS FASCICULARIS* HUDSON, FLORA AUGL. 1778; WILLDENOW, FLORA BEROL. 1787; WITHERING, ARR. IV, 1796; *HYPHOLOMA PAPILLATUM* PATOUILLARD, BULL. SOC. MYC. 1898.

Pileus fleshy, ovoid then campanulate and expanded, subumbonate; the flesh thin, yellow; the surface smooth and glabrous, yellow, fulvous in the center. *Stipe* slender, flexuous, fistulous, fibrillose, yellow within and without. *Lamellae* narrow, crowded, adnate, at first sulphur-yellow, becoming green; spores elliptic, $6-7 \times 4$ mic.

Densely caespitose; growing on old stumps and about them on the ground. Probably common everywhere. *Pileus* 3-5 cm. in diameter; *stipe* 3-10 cm. or more in length, 2-4 mm. thick. Readily distinguished by its color, thinness and intensely bitter taste.

13. *HYPHOLOMA LATERITIUM*, *AGARICUS LATERITIUS* SCHAEFFER, INDEX, 1774; PERSOON, COMM. 1800; *AGARICUS FASCICULARIS*, VAR. 3, WITHERING, ARR. IV, 1796; *AGARICUS SUBLATERITIUS* FRIES, EPICRISIS, 1836; *AGARICUS PERPLEXUS* PECK, 23 N. Y. REP. 1870.

Pileus fleshy, convex then expanded, obtuse, discoid; the flesh rather thick, compact, white then yellowish; the surface smooth, becoming glabrous, tawny to brick-color, paler toward the margin. *Stipe* tapering downward, stuffed, fibrillose, ferruginous. *Lamellae* rather narrow, close, adnate, at first whitish, becoming sooty-ochraceous; spores purple-brown, elliptic, $6-7 \times 3-4$ mic.

Subcaespitose; growing on and about old stumps; common everywhere. *Pileus* 6-10 cm. in diameter; *stipe* 8-12 cm. or more long, 6-10 mm. thick. A large and variable *Agaric*; the taste bitter.

14. *HYPHOLOMA CAPNOIDES* FRIES, OBS. II, 1818; ICONES, 133.

Pileus fleshy, convex then explanate, obtuse; the flesh thin, white; the surface dry, smooth and glabrous, yellowish to ochraceous; the veil white, appendiculate. *Stipe* equal, often curved and flexuous, fistulous, silky-smooth, pallid. *Lamellae* broad, rather close, adnate, gray-blue becoming purplish-brown; spores elliptic, $7-8 \times 4-5$ mic.

Caespitose; growing on trunks of Pine in mountain woods, Pacific Coast Cat. *Pileus* 3-7 cm. in diameter; *stipe* 5-10 cm. long, 4-8 mm. thick. Odor and taste mild.

15. HYPHOLOMA EPIXANTHUM FRIES, EPICRISIS, 1836; ICONES, 133.

Pileus fleshy, convex then explanate, somewhat gibbous; the flesh thin, yellowish; the surface smooth, slightly silky, at length glabrous, yellow or pallescent, commonly darker in the center; the veil white. Stipe nearly equal, hollow, floccose-fibrillose, whitish at the apex and pruinose, below dilute ferruginous or brownish. Lamellae broad, close, adnate, pale yellow, at length cinerascens; spores elliptic, 6-7 x 4 mic.

Subcaespitose; growing on old trunks, especially of Pine; Atlantic states to Pacific. Pileus 4-8 cm. in diameter; stipe 6-8 cm. long, 6-8 mm. thick. The lamellae never becoming purple or green.

16. HYPHOLOMA MARGINATUM, AGARICUS MARGINATUS PERSOON, OBS. MYC. I, 1796; AGARICUS DISPERSUS FRIES, EPICRISIS, 1836; ICONES, 133.

Pileus fleshy, campanulate then convex and expanded, not hygrophanous, the flesh thin, pallid; the surface honey-color to fulvous, smooth, but around the margin white-silky or scaly from the veil. Stipe slender, tough, stuffed then hollow, equal, straight, silky-fibrillose, brown-ferruginous, pallid above. Lamellae broad, close, adnate, pale straw-color, afterward nebulous; spores ovoid-oblong, 12-14 x 6 mic.

Commonly solitary; growing in Pine woods on trunks and on the ground; N. Carolina, *Curtis*; Pacific Coast Cat. Pileus 3-5 cm. in diameter; stipe 5-7 cm. long, 2-4 mm. thick.

b. The surface of the pileus slightly viscid.

17. HYPHOLOMA RUGOCEPHALUM ATKINSON, MUSHROOMS, 1900.

Pileus fleshy, convex then expanded, broadly umbonate; the surface glabrous, radiately rugulose, slightly viscid, fulvous; the flesh thin, yellowish; veil marginal, lacerate. Stipe arising from a bulbous base, fistulous, smooth and glabrous, concolorous with the pileus; a slight annulus composed of a few threads of the veil remains upon the stipe. Lamellae rather broad, adnate, slightly sinuate, spotted with the black spores, lighter on the edge; spores purplish-black, minutely tuberculate, pointed at each end, 8-11 x 6-8 mic.

Subcaespitose; growing in damp places in woods; New York *Atkinson*. Pileus 6-10 cm. in diameter; stipe 8-12 cm. long, 6-10 mm. thick.

(To be continued.)

NOTES FROM MYCOLOGICAL LITERATURE. XXVII.

W. A. KELLERMAN.

Kern, Frank Dunn.

Some interesting species are described in the September No. of the Bulletin of the Torrey Botanical Club (1907) under the title of "New western Species of Gymnosporangium and Roeselia," the same being *Gymnosporangium betheli* n. sp. ("without doubt the most injurious to the cedars of all the species"); *Gymnosporangium durum* n. sp. (produces "a very regular, nearly globose, hard, woody gall"); *Gymnosporangium inconspicuum* n. sp. ("a very inconspicuous species; the small pulvinate sori breaking forth between the leaves soon become gelatinized and form a film over the surface of the leaves"). The *Roesteliae* are *R. betheli* n. sp., *R. harknessiana* Ellis & Ev. n. sp., and *R. Harknessianoides* n. sp.

Whetsel, H. H.

A lecture on "Some Bacterial Diseases of Plants: Their Nature and Treatment," delivered before the Massachusetts Horticultural Society [published in the Transactions for 1907], with stereoptican illustrations, classifies the diseases as *Blights* (Fire Blight of Pears, etc., Mulberry Blight, Walnut Bacteriosis, Alfalfa Blight, Bean Blight), *Rots* (Black Rot of Cabbage, etc., Soft Rot of Turnips, etc.), *Wilts* (of Cucumbers, squashes, and melons, of potatoes, tomatoes and egg plant, of Sweet corn, of Tobacco), *Galls* (of Olive and Oleander, and root galls or nodules of Legumes). The annual history of the Fire Blight is fully given; the fact is emphasized that the blight bacteria are never carried by the wind and they do not exist in the soil; the milky drops of a sticky fluid oozing from diseased tissues transported by flies and other insects explains the inoculation of the host plants.

Saccardo, P. A.

We find in Boletín de Sociedade Broteriana, XXI, 1894-5, forty species enumerated under the title "Fungi aliquot Africani lecti Cl. A. Moller, Is. Newton et A. Sarmento, auctore P. A. Saccardo." New species are: *Dimerium radio-fissile*, *Meliola thomasiana*, *Leptosphaeria larvalis*, *Micropeltis clavigera*, *Mic. corynespora*, *Mic. molleriana*, *Diplodia vignae*, *Septoria thomasiana*, *Rhabdospora insulana*, *Gloeosporium colubrinum*, *Tuberulina apiculata*.

Hunter, George William.

In "Elements of Biology, a practical text-book correlating Botany, Zoology and human Physiology," we find about a dozen pages devoted to Fungi, Parasites, and Saprophytes.

Shear, C L.

Bulletin No. 110, Bureau of Plant Industry, U. S. Dept. Agr., is devoted to the "Cranberry Diseases." Special attention is given to *Guignardia vaccinii* Shear (blast and scald); *Acanthorhynchus vaccinii* Shear (rot); *Glomerella rufomaculans vaccinii* Shear (anthracnose); *Exobasidium oxycocci* Rostr. (hyperthrophy); a large number of less important diseases are given, fungi which attack the fruit, and the leaves or stems. Preventive and remedial measures are included, also a bibliography of cranberry diseases. There are seven full page illustrative plates, the first a colored frontispiece showing Cranberry Scald. The American Cranberry has been in cultivation seventy-five years or more and is attacked by many fungous enemies; however, only five species have been reported on the wild plant in its native habitat.

Lawrence, W. H.

Bulletin 66, Washington State Experiment Station, is devoted to "Blackspot Canker;" studies, observations, and experiments, with thirteen pages of illustrations. The fungus has been described by Peck as *Macrophoma curvispora*, and by Cordley as *Gloeosporium malicorticis*. "Neither of the descriptions agree closely with the fungus observed in these investigations."

Smith, G. D.

Mr. Smith sends out a printed list of one hundred "Mushrooms and Toadstools" which he offers (at reasonable prices) in both stereographs and lantern slides. "They will be in natural colors and can be used to a very great advantage in school work as well as for a general study of the subject." We have seen many of the photographs and can say that they are admirable. Mr. Smith's address is 450 Spicer Street, Akron, Ohio.

Shear, C. L. (and Quaintance, A. L.)

The Fungus (and Insect) Enemies of the Grape east of the Rocky Mountains are recounted and briefly described, with text illustrations, and remedies, in Farmers' Bulletin No. 284. Those regarded as chief are Black-rot (*Guignardia bidwellii*), Downy Mildew (*Plasmopara viticola*), Powdery Mildew (*Uncinula necator*), Anthracnose (*Sphaceloma ampelinum*), and Ripe-rot (*Glomerella rufomaculans*).

Fink, Bruce.

Cladonia bacillaris, *Cl. macilenta*, and *Cl. didyma* are described and discussed in the September No. of the *Bryologist*: "Further Notes on Cladonias, XII." Illustrations natural size, also magnified two or three diameters, are given of *Cladonia bacillaris* and *Cl. macilenta*.

Arthur, J. C.

In the *JOURNAL OF MYCOLOGY*, September 1907, Dr. Arthur makes his seventh report, "Cultures of Uredineae in 1906." He calls especial attention to the experimentally unravelled life history of the Rust which inhabits flax, remarking of this study of the serious menace to successful flax growing that "it greatly clarifies the problem of controlling the flax rust in the interest of the cultivator." Of selected materials after tests, 48 collections were available belonging to three species of Rusts, exclusive of the aecial pine rusts, and from these 223 sowings were made. Also 53 sowings were made with *Caeoma* and *Peridermium* spores from pine, all without infection, 27 sowings with teliospores of *Gymnosporangium*, and 23 sowings with various aeci-spores. That is, 324 sowings were made, and 134 species grown temporarily in the greenhouse were used as hosts. The tabulation of negative results, and repetitions of previous work is extended—and in that connection a new species is described, namely *Uromyces effusus*. We take space to reproduce the summary for species here reported for the first time: 1. *MELAMPSORA LINI* (Link) Desmaz.—Teliospores on *Linum usitatissimum* L. sown on *L. Lewisii* Pursh and *L. usitatissimum* L. 2. *UROMYCES SILPHII* (Syd.) Arth.—Teliospores on *Juncus tenuis* Willd. sown on *Silphium perfoliatum* L. 3. *GYMNOSPORANGIUM NELSONI* Arth.—Teliospores on *Juniperus scopulorum* Sarg. sown on *Amelanchier canadensis* (L.) Medic. and *Sorbus americana* Marsh.

Fink, Bruce.

Illustrated and discussed are *Cladonia cristatella* and *Cladonia coccifera* in "Further Notes on Cladonias, XII," The *Bryologist* for November, 1907. The first named species is a distinctly North American lichen; the second is known in all the grand divisions except Africa.

Hebden, Thomas.

A list of fourteen species is given, "Some British Columbia Lichens" (Rossland, B. C.), in the November *Bryologist*, 1907.

Lawrence, W. H.

The disease "Apple scab in Eastern Washington" is discussed in Bulletin 75 of the Experiment Station, fourteen pages, no figures used, but the two stages of the fungus are noted, its life history given, and Bordeaux mixture recommended as a preventive.

Floyd, Bayard F.

A popular account of "Some common Fungus Diseases and their Treatment" was published in the Annual Report of the Missouri State Horticultural Society, 1905, and reissued as Circular of Information No. 21, Missouri Agricultural Experiment Station.

Maire, René.

We find the interesting first fascicule of "Étude des Champignons récoltes en Asie Mineure" in the Bulletin de la Société des Sciences de Nancy, 1906. Some of our commonest species flourish in the Orient, as *Cystopus candidus*, *Erysiphe polygoni*, *Phyllactinia corylea*, *Sphacelotheca reiliana*, *Puccinia menthae*, etc. Several new species are described, also a new genus of *Hysteriaceae*, namely, *Hadotia*. The author says ce genre correspond exactement, parmi les *Hystériacées* scolécosporées, aux genres *Hysterium*, *Hysterographium*, *Glonium*, etc., des autres tribus. It should be noticed also that the author transfers *Physoderma asphodeli* Vestergren (*Cladochytrium asphodeli* Debray) and *Cladochytrium urGINEAE* Pat. et Trab. (*Physoderma debeauxii* Bubák, *Entyloma debeauxii* Bubák) to the genus *Urophlyctis*.

Fink, Bruce.

In "Further Notes on *Cladonias*, IX," two species very closely related are fully discussed, namely, *Cl. squamosa* and *Cl. subsquamosa*. Certain forms of *Cl. squamosa* may, besides, be confused with forms of *Cl. furcata*. Half-tone illustrations are given of *Cl. squamosa denticollis* f. *squamosissima*, and *Cl. squamosa phyllocoma*.

Journal of Mycology, Vol. 13, Sept., 1907.

The titles in this No. are as follows: Atkinson and Edgerton, *Protocoronospora*, a New Genus of Fungi; Jennings, A Case of Poisoning by *Amanita phalloides*; Davis, A New Species of *Protomyces*; Arthur, Cultures of *Uredineae* in 1906; Wilson, An Historical Review of the Proposed Genera of *Phycomycetes*; Kellerman, Index to North American Mycology; Notes from Mycological Literature, XXV; Editor's Notes.

Atkinson, Geo. F., and Edgerton, C. W.

These authors describe a new genus and new species, under the head of "Protocoronospora, a new Genus of Fungi" in the September No. of the Journal of Mycology. Professor Atkinson found this disease on the cultivated vetch—first discovered on the stems and pods from a small patch of vetch on the horticultural grounds of Cornell University and later collected on vetch in the fields on the University farm where it seems to be abundant and a serious pest, often being associated with an Ascochyta. In structure this new fungus is said to resemble that of species of Corticium. The new species is named *Protocoronospora nigrans* by the authors.

Broteria, Vol. VI, 1907, II Parte.

The mycological articles in this *Revista de ciencias naturales do Collegio de S. Fiel* are as follows: *Les Myxomycètes, Étude des Espèces connues jusqu'ici par C. Torrend*; *Contributio ad monographiam Agaricacearum et Polyporacearum Brasiliensium auctore Dr. J. Rick.*

Sturgis, W. C.

In the Colorado Publication, General Series No. 30, Sept. 1907, we find "The Myxomycetes of Colorado," including a General account of the Group, Key to the Orders and Genera, and an enumeration of the known Colorado species with critical notes, distribution, etc. A new variety of *Didymium squamulosum* (var. *claviforme*) is proposed, also one of *Spumaria alba* (var. *solida*); and a new species, *Physarum testaceum*. *Comatricha suksdorfii* Ell. & Ev. and *C. aequalis* Peck are reduced to the rank of varieties under *C. nigra*. Almost 100 species and varieties are here reported as belonging to the flora of Colorado.

Jennings, O. E.

A detailed account is given of "A case of poisoning by *Amanita phalloides*," in the Journal of Mycology, September, 1907. One person lost his life and others were seriously poisoned.

Davis, J. J.

A description is given by Dr. Davis of "A new species of protomyces," namely, *P. gravidus*, on *Bidens cernua* and *Bidens connata*, sparingly on *Bidens frondosa*, Wisconsin, July to November. See Journal of Mycology, September, 1907.

Wilson, Guy West.

In the September No. of the Journal of Mycology may be found "An historical Review of the proposed Genera of Phycomycetes, I, Peronosporales;" the genera being arranged chronologically, with the type species, the synonyms, the homonyms, and other information. Those listed as tenable in this order are: Albugo, Basidophora, Bremia, Chlorospora, Kawakamia, Peronospora, Phleophythora, Phytophthora, Plasmodium, Pseudoperonospora, and Sclerospora.

Smith, Erwin F.

Dr. Smith takes issue with Howard S. Reed in statements relative to "The Parasitism of Neocosmospora" — this title used by both authors in articles in Science. "Inference versus fact," is the key to the situation — *i. e.* many inferences in the first article are declared by Dr. Smith to be unwarranted, for example, that the ginseng-fungus belongs to the genus Neocosmospora; that the ginseng-fungus and the watermelon-fungus (first described by Dr. Smith as *Fusarium niveum*) are identical; that the watermelon-fungus can enter the plant only when a way has been opened for it by other fungi, *e. g.*, by *Thielavia*, etc. Besides the discussion and criticism, some experiments are reported indicating that the ginseng-fungus and watermelon-fungus behave differently and are probably identical organisms.

Rick, J.

An important paper, "Contributio ad monographium Agaricearum et Polyporacearum Brasiliensium," is published by Dr. J. Rick, in Volume VI, 1907, II part, Series Botanica, of Broteria. This is based on prolonged exploration and study in that region, and the installment in question contains 186 species, 10 of which are described as new. Many in the list enumerated are cosmopolitan — a further illustration and justification of the view of Lloyd and Bresadola as to wide distribution of most species.

Annales Mycologici, Vol. V, No. 3, June, 1907.

The articles are as follows: Rehm, Ascomycetes exs. Frasc. 39; Neger, F. W. and Dawson W., Ueber *Clithris quercina* (Pers.) Rehm.; Keissler, Karl von, Beitrag zur Pilzflora Kaerntens; Bresadola, J., Fungi Javanici lecti a cl. Prof. Dr. E. Heinricher; Schorstein, Josef, Polyporus; Dietel, P., Einige Neue Uredineen aus Sued-amerika; Jaap, Otto, Beitrage zur Pilzflora der Schweiz; Lind, J., Bemerkenswerte Pilzfunde in Daenemark; Neue Literatur; Referate und kritische Besprechungen.

Dietel, P.

Under the title of "Einige neue Uredineen aus Suedamerika," *Annales Mycologici*, June, 1907, the following are described by Dr. Dietel: *Uromyces celtidis* on leaves of *Celtis* sp.; *Puccinia usterii* on leaves of a Malpighiaceae; *Puccinia compressa* on a Bignoniaceae; *Puccinia transformans* on *Solanum tomatillo*; *Puccinia tessariae* on *Tessaria absinthioides*; and *Coleosporium braziliense* on a Labiate.

Smith, Elizabeth H.

Technical Bulletin No. 3, Massachusetts Agricultural Experiment Station, April, 1907, contains "The Blossom end Rot of Tomatoes," which after study and experiment is decided to be *Fusarium solani* Mart.

Smith, Ralph E.

The Report of the Plant Pathologist, to July 1, 1906, California Experiment Station, Bulletin 184, January, 1907, deals very largely with Pear Blight work, also discusses Walnut Blight (*Pseudomonas juglandis* Pierce) peculiar to the Pacific Coast, Lemon Rot, and a few other diseases. A 10-page list is given of Plant Diseases of California.

Rolfs, F. M.

The Report of the Department of Botany and Horticulture, Florida Experiment Station, 1905, notes many diseases of Bean, Cabbage, Cantaloupes, Celery, Dewberries, Grape-fruits, Lettuce, Oranges, Peaches, Potato, Tomato, and Watermelon.

Cobb, N. A.

A very thorough study of the "Fungus Maladies of the Sugar Cane, as occurring in Hawaii," is given by Mr. Cobb as Bulletin 5, Division of Pathology and Physiology, Experiment Station of the Hawaiian Sugar Planter's Association, 1906. The diseases are as follows: Root Disease [*Itthyphallus coralloides* n. sp.], Leaf-splitting Blight [*Mycosphaerella striatiformans* n. sp.], Rind Disease, Pineapple Disease [*Thielaviopsis ethacetica* Went.], Eleau [possibly caused by insects preceding a fungus]. The following also is described: *Marasmius sacchari* *Hawaiiensis* Cobb n. var. There are seven fine plates. The text is on good glazed paper.

Fink, Bruce.

Cladonia decorticata and *Cladonia degenerens* are discussed and figured in the May *Bryologist* (1907) under the title "Further Notes on Cladonias, X."

Orton, W. A.

In Farmers' Bulletin 302, U. S. Department of Agriculture, Mr. Orton gives a brief account of the disease of Sea Island Cotton, namely, Sore-shin and Damping-off (due to *Rhizoctonia*); Bacterial Blight (*Bacterium malvacearum* Erw. Sm.); and Wilt (*Neocosmospora vasinfecta* (Atks.) Erw. Sm.).

Cobb, N. A.

The "Third Report on Gumming of the Sugar-Cane" forms Bulletin No. 3, Division of Pathology and Physiology, Experiment Station of the Hawaiian Sugar Planters' Association. This disease was first discovered in Australia; it is caused by *Bacterium vascularum* (Cobb) Grieg-Smith.

Butler, E. J.

Mr. Butler, the Imperial Mycologist, Department of Agriculture in India, gives an account of "Some Diseases of Cereals caused by *Sclerospora graminicola*," being Vol. II, No. 1, Memoirs, Botanical Series, March, 1907. The grasses involved are *Pennisetum typhoideum*, *Andropogon sorghum*, *Setaria italica*, and *Euchlaena* (*Rheana*) *luxurians*.

Petch, T.

There is a brief but excellent summary by Hasselbring in the September Botanical Gazette, 1907, of "Fungi in termite nests," as given by the above author in Ann. Roy. Bot. Gar. Paradeniya. "The only form on the normal comb is a hyphomycete which was not determined, but from the descriptions seems to be like *Sterigmatocystis*. This fungus seems to be endemic in the nests, not found outside them. When the combs grow old they give rise to two forms of agarics, which, however, the author regards as one species (*Volvaria eurrhiza*). A third form in the fresh termite comb is *Xylaria nigripes*. . . . All the forms described are eaten by the termites. When an inhabited comb is enclosed under a bell-jar the termites eat off the heads of the hyphomycete and also the *Xylaria* as it develops. They also eat the stalks of the agarics following them to the surface of the ground. It is probable, therefore, that the fungi of the termite nests form food for the inhabitants, as do the "fungus gardens" for the leaf-cutting ants."

Hedwigia, Band XLVI, Heft 3-4, 15 Feb., 1907.

In this No. only two articles are mycological, namely, Edv. A. Waino, *Lichenes novi rariosque*; Fr. Bubák und J. E. Kabát, *Mykologische Beiträge* (Anfang).

Vanha, J.

A paper by this author in *Zeitschrift fuer Zuckerindustrie* in Boehmen 1902, namely, "Eine neue Blattkrankheit der Ruebe," is reviewed by Dr. G. Lindau who points out that the statement to the effect that this new species (*Microsphaera betae*) does not as the author stated, produce zoosporangia. Es handelt sich hier ueberhaupt nicht um Zoosporen, sondern um den oeligen Plasma-inhalt der Konidien, der Brown'sche Molekularbewegung erkennen laesst.

Bulletin de la Société Mycologique de France, Tome XXIII, 2e Fascicule, 15 July, 1907.

The articles are as follows: N. Patouillard, Champignons nouveaux du Tonkin, Quesques Champignon de l'Afrique occidentale; A. Sartory, Récolte et emploi de l'*Elaphomyces granulatus*, Etude biologique du *Cryptococcus* (*Saccharomyces*) *glutinus* Fres. (Kuetz.); G. Bainier, Mycothèque de l'Ecole de Pharmacie XII-XVII; Dumée, Note sur l'*Agaricus pudicus* Bull.; L. Lutz, Nouveau procédé de conservation des Champignons avec leurs couleurs; F. Guegen, Bibliographie analytique; W. Russell, Distribution des Champignons comestibles et vénéneux dans les bois des Casseaux; Felix Pyat, Compte-rendu de l'Exposition de Champignons du Jardin des Plantes d'Angers.

McAlpine, D.

The Department of Agriculture, Victoria, issued in 1906 a splendid book on "The Rusts of Australia, their Structure, Nature and Classification," by D. McAlpine. The first 75 pages are devoted to the general characters and mode of life and the remainder of the book (pp. 77-347) is occupied with the classification and technical descriptions, Bibliography, Glossary, Descriptions of Plates and Indexes. There are 54 full-page plates — the first ten natural in size and color and nearly all of the others microphotographs of spores x 250. The descriptions are admirable — full and conveniently paragraphed. This book has been critically and appreciatively commented upon by Dr. Arthur in previous pages of this Journal.

Whetzel, H. H.

Bulletin 236, February, 1906, Cornell University Experiment Station, is an important contribution to the subject of "Blight Canker of Apple trees." The term "Canker" is applied to diseases which cause the death of definite areas of bark on the limbs and bodies of trees. The diseased areas may be smooth and sunken or enlarged or roughened. The distinct canker diseases of apple trees which have been described in pathological literature are as

follows: European canker (*Nectria ditissima* Tul.); New York Apple-tree Canker (*Sphaeropsis malorum* Pk.); Black Spot Canker (*Gloeosporium malicorticis* Cordley); Illinois Apple-tree Canker (*Nummularia discreta* Tul.); Bitter rot Canker (*Glomerella rufomaculans* (Berk.) Spal. & v. Schar. (and Blight Canker of Apple-trees (*Bacillus amylovorus* (Burr.) de Toni). It is to the last of these that Mr. Whetzel's illustrated Bulletin is specially devoted.

Smith, Clayton O.

The Leaf-spot on Cucurbits [*Sphaerella citrullina* (Chester) Smith]. A Leaf-spot disease of Egg-plant (*Ascochyta lycopersici* Brun.), and Leaf-spot on Bean and Cowpeas (*Phyllosticta phaseolina* Sacc.) are included in the "Study of the Diseases of some Truck Crops in Delaware." The perfect stage of *Phyllosticta citrullina* Chester (transferred to *Ascochyta citrullina*) was obtained by cultures, namely, *Sphaerella* as given above.

Berger, E. W.

Aschersonia aleyrodes, *Aschersonia favo-citrina*, and the Brown Fungus are those alluded to and recommended under the heading "Whitefly conditions in 1906—the use of the Fungi," in Bulletin No. 88, Florida Agricultural Experiment Station, January 1907. Spraying for Scale would kill these fungi serviceable for reducing the Whitefly. It is suggested that to reduce the scale, fungi may be introduced, namely, the Red Headed Scale Fungus (*Sphaerostilbe coccophila*), the Gray Headed Scale Fungus (*Ophionectria coccicola*), and the Black Scale fungus (*Myrangium duryii*).

Edgerton, C. W.

The conclusions of "The Rate and Period of Growth of *Polyporus lucidus*," Torreya, Vol. 7, No. 5, May 1907, are: (1) *Polyporus lucidus* is a fast growing member of the Polyporaceae, growth averaging about one-half centimeter per day for the growing period; (2) Growth is exogenous, taking place entirely at the edge of the plant and continuing as long as conditions are favorable; (3) The change in the development from stalk to pileus is a gradual process; (4) The average lateral growth is but slightly more than the terminal growth.

Smith, R. Grieg.

In the Proceedings of the Linnean Society of New South Wales, 1904, Part 3, June 29, is described the "Red String of the Sugar Cane," not to be confounded with the Sereh Disease (cause ?), Sugar Cane Disease of Massee [*Trichosphaeria sacch-*

ari], the Pine-apple Disease of the Cane [Thielaviopsis ethacetica Went.], and the Red Smut of the Sugar Cane [Colletotrichum falcatum Went.], but is caused by a new species of Bacteria, namely, Bacillus pseudoarbus Gr. Sm. n. sp.

Otto Jaap, Fungi Selecti Exsiccati, ser. IX and X.

This installment was issued April 1907, the Nos. being 201-250. A wide range of groups is represented including many interesting species.

Comptes Rendus des Séances de l'Académie des Sciences, Tome 140, Jan.-June, 1905.

The mycological articles are as follows: Hyphoides et Bactérioides, Paul Vuillemin; La Miltose hétérotypique chez les Ascomycètes, René Maire; Production expérimentale de l'appareil ascospore de la Morille, Marin Molliard; Sur les conditions de développement du mycélium de la Morille, G. Fron; La culture de la Morille, Ch. Répin; Sur la biologie des Saprologaniées, Paul Dop; Nouvelles espèces d'endophytes d'Orchidées, Noel Bernard; Sur le Stearophora radicola, Champignon des racines de la Vigne, L. Mangin et P. Viala; La rouille blanche du Tabac et la nielle ou maladie de la mosaïque [Bacillus maculicola], Georges Delacroix; Sur une pourriture bactérienne des choux.

Comptes Rendus des Séances de l'Académie des Sciences, Tome 142, Jan.-June, 1906.

The mycological articles given below are found in this volume: P. Hariot et N. Patouillard, Sur un nouveau genre de Champignons de l'Afrique orientale anglaise; Nicolas Jacobesco, Nouveau Champignon parasite, Trematovalsa matruhoti, causant le chancre de Tulleul; P. Viala et P. Paccottet, Sur les levures sporulées de Champignons à périthèces (Gloeosporium); P. Viala et Pacottet, Sur les kystes des Gloeosporium et sur leur rôle dans l'origine des levures; J. Beauverie, Sur la maladie des Platanes due au Gnomia veneta (Sacc. et Speg.) Klebahn [Gloeosporium nervisequum (Fuck.) Sacc.] particulièrement dans les pépinières; Dangeard, La Fécondation nucléaire chez les Mucorinées.

Miyake, Ichiro.

Under the title "Ueber einige Pilz-Krankheiten unserer Nutzpflanzen," Botanical Magazine, March 1907, a few interesting fungi are fully described, among others the following: Gloeosporium theae-sinensis Miyake n. sp. found on Tea leaves in the vicinity of Tokio, Japan. The species is said to be distinct from Gloeosporium theae Zimm. described from Africa.

Stockdale, F. A.

This Report of Mr. Stockdale, Mycologist attached to the Imperial Department of Agriculture for the West Indies, printed in the Bulletin of Miscellaneous Information, Botanical Department, Trinidad, October 1907, deals with three diseases of the Cocoa-nut Palm, called Root-disease, Leaf-disease, and the Bud-rot. The first named is the most serious, caused apparently by a *Botrydiplodia*. The Leaf-disease is caused by a *Pestalozzia*, possibly *P. palmarum* Cke.—yellowish spots on the leaflets especially near the tips.

Peck, Charles Horton.

In the Bulletin of the Torrey Botanical Club, July 1907, Dr. Peck describes "New Species of Fungi"—*Collybia subsulphurea*, *Omphalia vestita*, *Omphalia curvipes*, *Lactarius rufulus*, *Lactarius xanthogalactus*, *Entoloma modestum*, *Ecclia cinericola*, *Naucoria tabacine bicolor* var. nov., *Agaricus pattersonae*, *Psathyrella caespitosa*, *Hydnum kauffmanii*, *Macrophoma tiliacea*, and *Cucurbitaria erratica*.

Bulletin de la Société Royale de Botanique de Belgique, Tome 43, 1906.

The articles pertaining to mycology are the following: *Aperçu historique sur les espèces du g. Scleroderma* (Pers. p. p.) emend Fries de la Flore Belge, et *Considérations sur la détermination de ces Species*, par Ch. Van Bambeke; *Nouvelles Stations de Péronosporées en 1905*, par l'abbé Hyag. Vanderyst; *Lichens rares ou nouveaux pour la Belgique*, par Bouly de Lesdain; *Quelques remarques sur Polyporus rostkowii* Fr., par Ch. Van Bambeke; *Liste de Lichens recueillis à Spa*.

Comptes Rendus des Séances des Sciences, Tome 141, July-Dec., 1905.

Pertaining to mycology are the following articles: *Un nouvel ennemi des Caféiers on Nouvelle-Calédonie* [*Pellicularia koleroga* Cooke], I. Galland; *Sur la Structure et l'Evolution du Rhacodium ceblare*, F. Gueguen; *Nouvelles recherches sur l'appareil reproducteur des Mucorinées*, J. Dauphin; *Sterigmatocystis nigra et acide oxalique*, P. G. Carpentier.

Reed, Howard S.

In Science for Oct. 4, 1907, under the head of "The parasitism of *Neocosmora*," a reply is made to previous criticism by Dr. Erwin F. Smith in the same Journal.

Lewton-Brain, L.

A lecture on "Rind Disease of the Sugar Cane" forms Bulletin 7, Division of Pathology and Physiology, Experiment Station of the Hawaiian Sugar Planters' Association, in which it is shown that the imperfect fungus in same connection is *Melanconium sacchari*. The lecture also illustrates the structure of the Red Rot caused by *Colletotrichum falcatum*, and besides gives some reasons for thinking that *Thielaviopsis ethacetica* and *Melanconium sacchari* are different stages of one and the same fungus.

Clinton, G. P.

The Report of the Botanist, G. P. Clinton, Connecticut Agr. Exp. Station, Report 1906, Part V, issued May 1907, is an admirable one. The four sections are as follows: (1) Notes on fungous diseases, etc.; (2) Experiments to prevent Onion Brittle; Dry Rot Fungus, *Merulius lachrymans*; Root Rot of Tobacco, *Thielavia basicola*. The illustrations are sixteen full-page plates, halftones. The *Thielavia basicola* has not heretofore been brought into prominent notice in this country. The report on the study of this Tobacco disease is accompanied by the synonymy and bibliography.

**Comptes Rendus des Séances de l'Académie des Sciences,
Tome 143, July-Dec., 1906.**

Mycological articles are the following: E. Pinoy, Reproduction expérimentale du mycétoïde à grains noirs; Georges Delacroix, Sur une maladie de la Pomme de terre produite par *Bacillus phytophthorus* (Frank) Appel; L. Mangin et P. Hariot, Sur la maladie du rouge chez l'*Abies pectinata* [*Rhizosphaera* n. g., *Menoidea* n. g.]; G. Odin, Sur l'existence de formes levures stables chez *Sterigmatocystis versicolor* et chez *Aspergillus fumigatus*, et sur la pathogénicité de la levure issue de ce dernier type.

INDEX TO AMERICAN MYCOLOGY.

Alphabetical List of Articles, Authors, Subjects, New Species and Hosts, New Names and Synonyms.

W. A. KELLERMAN.

- ACANTHORHYNCHUS Shear n. gen. Ascomycetae. Bull. Torr. Bot. Club, 34:313. June 1907.
- ACANTHORHYNCHUS vaccinii Shear n. sp. on leaves of *Vaccinium macrocarpum*. Bull. Torr. Bot. Club, 34:314. June 1907.
- ACER rubrum, dead wood, host to *Flammula expansa* Peck n. sp. N. Y. State Mus. 1906 Bull. 116 (Bot. 10):24. July 1907.
- ADIANTUM curvatum Kf., host to *Cryptopeltis ferruginea* Rehm n. n. [Brazil, S. A.] Ann. Mycolog. 4:410. Oct. 1906.
- ADIANTUM curvatum Kf., host to *Cryptopeltis obtecta* Rehm n. sp. [Brazil, S. A.] Ann. Mycolog. 4:409. Oct. 1906.
- AECIDIUM compositarum silphii Burrill, *syn. of Uromyces silphii q. v.*
- AECIDIUM ipomoeae Schw. (Berk. Grev.) *syn. of Albugo ipomoeae panduranae q. v.*
- AECIDIUM ipomoeae-penduranae Schw., *syn. of Albugo ipomoeae panduranae q. v.*
- AECIDIUM patagonicum Speg. n. sp., on leaves of *Collomia gracilis*. [Argentina, S. A.] An. Mus. Nac. Buenos Aires, Ser. III, 8:66. 1902.
- AECIDIUM silphii Syd. Ured. 1546, *syn. of Uromyces silphii q. v.*
- AESCLUSUS glabra Willd., host to *Cucurbitaria erratica* Peck n. sp. Bull. Torr. Bot. Club, 34:349. July 1907.
- AGRICUS pattersonae Peck n. sp., ground under pine and cypress trees. Bull. Torr. Bot. Club, 34:347. July 1907.
- ALBUGO, The Genus, see *Studies in North American Peronosporales*
- ALBUGO, Key to the species. [Wilson.] Bull. Torr. Bot. Club, 34:63-64. Feb. 1907.
- ALBUGO (Pers.) S. F. Gray. [Synonymy, description, type, monograph. Wilson]. [Uredo § Albugo Pers.; Cystopus Lév.] Bull. Torr. Bot. Club, 34:63. Feb. 1907.

- ALBUGO bliti (Biv.) Kuntze [Uredo bliti Biv.; Caeoma amaranthi Schw.; Cystopus bliti de Bary; Cystopus amaranthi Berk.; Cystopus amaranthacearum Zalew.; Cystopus cyathulae Winter. Wilson.] Bull. Torr. Bot. Club, 34:77. Feb. 1907.
- ALBUGO candida (Pers.) Kuntze [synonymy, description and distribution. Wilson.] [Aecidium canadidum Pers.; Uredo candida Pers.; Uredo cheiranthi Pers.; Cystopus candidus Lev.] Bull. Torr. Bot. Club, 34:64. Feb. 1907.
- ALBUGO ipomoeae-panduranae (Schw.) Swing. [Aecidium ipomoeae-panduranae Schw.; Ae. ipomoeae Schw. (Berk.) Caeoma convolvulatum Link; Uredo convolvulae Spreng.; Cystopus convolvulacearum Otth., ditto Speg.; Cystopus ipomoeae-panduranae Stev. & Swing. Wilson.] Bull. Torr. Bot. Club, 34:68. Feb. 1907.
- ALBUGO lepigoni (de Bary) Kuntze [Erysibe sphaerica b carophyllacearum Wallr.; Cystopus lepigoni de Bary; Cystopus argentinus Speg. Wilson.] Bull. Torr. Bot. Club, 34:71. Feb. 1907.
- ALBUGO occidentalis Wilson n. sp., on Blitum capitatum L., and Chenopodium rubrum L. Bull. Torr. Bot. Club, 34:82. Feb. 1907.
- ALBUGO platensis (Epeg.) Swing. [Cystopus platensis Speg.] Bull. Torr. Bot. Club, 34:79. Feb. 1907.
- ALBUGO portulacae (D. C.) Kuntze Uredo portulacae D. C.; Cystopus portulacae de Bary. Bull. Torr. Bot. Club, 34:83. Feb. 1907.
- ALBUGO siberica (Zalew.) Wilson n. n. [Cystopus sibericus Zalew.] [Siberia.] Bull. Torr. Bot. Club, 34:68. Feb. 1907.
- ALBUGO spinulosa Kuntze, *syn. of Albugo tragopogonis* q. v.
- ALBUGO swertiae [Berl. & Kom.] Wilson n. n. [Cystopus convolvulacearum Speg. var. swertiae Berl. & Kom.] Bull. Torr. Bot. Club, 34:72. Feb. 1907.
- ALBUGO tragopogonis (DC.) S. F. Gray [Uredo candida b tragopogi Pers.; Uredo tragopogi DC.; Cystopus spinulosus de Bary; Cystopus cubicus de Bary; Cystopus pulverulentus B. & C.; Cystopus brasiliensis Speg.; Albugo spinulosa Kuntze; Cystopus tragopogonis spinulosus Davis; Cystopus mikaniae Speg. Wilson.] Bull. Torr. Bot. Club, 34:72. Feb. 1907.
- ALBUGO tropica (Lagerh. ined. [Wilson] [Cystopus tropicus Lagerh.] On Peperomia pellucida H. B. K. [S. A.] Bull. Torr. Bot. Club, 34:68. Feb. 1907.
- (To be continued.)

JOURNAL OF MYCOLOGY

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EDITOR'S NOTES.

"Personally I see no good reason for capitalizing any specific names, and my preference is decidedly in favor of following the practice of the zoologists" — an opinion expressed by a scientific writer which it is desirable to commend and heed. The zoologists as early as 1842 declared that "Specific names should *always* be written with a small letter even when derived from persons or places, and generic names should always be written with a capital." This custom has not changed; never was *Sitta canadensis* used in any other way, nor *Psaltriparus lloydi*, *Turdus aliciae bicknelli*, *Corvus americana*, *Papilio bairdi*, *Aphis brassicae*, or the balance of them. So written they are satisfactory for every purpose and from every point of view. But the botanical mind is at times apparently unstable; witness the following taken from a Catalogue: *Verbesina Virginica*, *Commelina virginica*, *Lycium Vulgare*, *Eleocharis Mutata*, etc. The reasons for invariably decapitalizing specific names — adjectives they are, or if nouns adjectiveal in significance — are ample in our opinion, but it would be of little avail to bring them forward again. It is "taste," mere custom perhaps, that carries the day for some people. But "tastes" differ; in our opinion the name *Tylostoma lloydii* "looks" quite as well as *sayi* or *batesii* — and if *Tylostoma lloydii* would perchance give offense to the mycologist honored, then it would seem a botanical name is after all not looked upon as something very impersonal.

Thirteen Parts of the Index to North American Mycology have now been issued — covering a period of seven years. This work has received cordial approval from many mycologists and a goodly number is found on the mailing list. It has been decided to extend the scope, and hereafter the area covered will be South as well as North and Central America. Installments may appear in every No. of the JOURNAL, but the Part or *Separate printed on one side of page* only, will not be distributed until the end of the year. Then all the items will be issued in one alphabetical list, the price to subscribers remaining approximately as at present.

The present No. is issued early, but the second No. of the year will be considerably delayed as usual.

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